

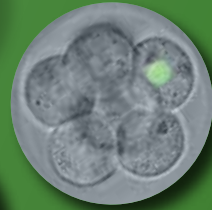
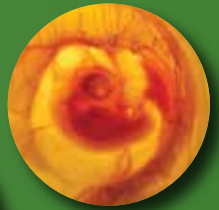


EMBL  
Australia



European Molecular Biology  
Laboratory Australia

# EMBL Australia March 2015 – February 2016 Annual Report



## EMBL Australia

Australia has been an associate member of EMBL, the European Molecular Biology Laboratory, Europe's flagship for the life sciences, since 2008.

Associate membership gives Australia the opportunity to internationalise our life sciences research: introducing the world's best young researchers to new networks and tools for life sciences here in Australia. It helps Australia develop highly competitive research teams networked across the nation and with Europe and Asia.

EMBL Australia was created to maximise the benefits of Australia's associate membership of EMBL and does so via research projects, infrastructure and training programs across Australia.

EMBL Australia is an unincorporated joint venture between the CSIRO, Bioplatforms Australia, the Association of Australian Medical Research Institutes (AAMRI), Universities Australia (UA) and EMBL. The secretariat is hosted by the Australian Regenerative Medicine Institute (ARMI) at Monash University.

EMBL Australia has:

- nodes and initiatives in Victoria, South Australia, New South Wales, Queensland, Tasmania, Western Australia and the ACT
- a nationwide reach through student and training programs, bioinformatics resources and bioinformatics network
- international linkages through EMBL and the European Bioinformatics Institute (EMBL–EBI).

# Contents



Report of the Chair of EMBL Australia Council	2
Report of the Scientific Head	3
EMBL Australia	4
2015–16 Highlights	10
2016–17 Outlook	15
The EMBL–Australia relationship	17
Life science research programs	18
Initiatives to support Australian life sciences	35
Student training and support	39
Outreach and communication	46
Professional activities	51
Staff and students	53
Research partners	56
Governance	57
Funding and stakeholders	62
Appendix 1. Publications	66
Appendix 2. Grants	70
Appendix 3. Membership of professional societies	73
Appendix 4. Journal editorial roles	74
Appendix 5. Additional academic contributions	75

# Report of the Chair of EMBL Australia Council

In 2015–16, EMBL Australia has moved into a new phase with renewal of Australia's associate membership of EMBL funded by the Australian Government through the National Collaborative Research Infrastructure Strategy (NCRIS). We also introduced a new governance structure that fully represents Australia's research community. This coincided with a change in Chair of the EMBL Australia Council in December 2015, as Prof Brandon Wainwright replaced the retiring inaugural Chair, Prof Richard Larkins.

A significant event for EMBL Australia was the resignation of Scientific Head Prof Nadia Rosenthal, who leaves us at the end of the reporting period to take up a position as Scientific Director of the renowned Jackson Laboratory in Maine, USA. Nadia has been the driving force behind EMBL Australia from the beginning.

We are pleased to report that Prof James Whisstock, National Health and Medical Research Council Senior Principal Research Fellow at Monash University and Scientific Director of the Australian Research Council Centre of Excellence in Advanced Molecular Imaging, successfully nominated to fill the role of scientific head of EMBL Australia. He begins on 1 March 2016.

Over the past year, EMBL Australia has continued to expand, adding new groups at our NSW and Victorian nodes and appointing two more group leaders to start in 2016: Pirjo Apaja in South Australia and Mikaël Martino in Victoria.


In the past year, EMBL Australia has successfully moved the Australian Bioinformatics Resource to a new host institution — The University of Melbourne's Victorian Life Science Computation Initiative. Now restructured into a hub and nodes service model, the resource is placing an increased emphasis on training and support to bioinformaticians and the life sciences community.

Following a successful pilot at the University of New South Wales (UNSW) in 2015, we are pleased that 2016 will see an expansion of the EMBL Australia Partnership PhD Program, which provides Australian and international PhD students with the opportunity to work with our research teams and take advantage of the programs offered by EMBL's many campuses as well as our own programs.

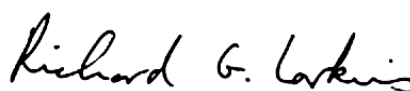
EMBL Australia's focus on early-career scientists, from students through to postdoctoral scientists, establishing their own research programs makes it a unique and vital addition to the Australian research community.

We thank Executive Director Silvio Tiziani, the leadership team and the EMBL Australia Council members (former and current), for their hard work and dedication to keeping EMBL Australia running smoothly. We also thank our stakeholders, including the Australian Government, Universities Australia, Bioplatforms Australia, CSIRO, our partner research institutes and EMBL for their ongoing support of EMBL Australia.

Finally, we thank outgoing Scientific Head Nadia Rosenthal for her vision and persistence in building EMBL Australia from an idea into the thriving organisation it is today. We wish her the best with her new role at The Jackson Laboratory and look forward to opportunities for future collaborative work.



**Prof Brandon Wainwright**  
Chair, EMBL Australia Council



**Prof Richard G. Larkins, AO**  
Former Chair, EMBL Australia Council

# Report of the Scientific Head



Sadly, this is my last report as the Scientific Head of EMBL Australia as I am leaving to take up a position as Scientific Director of The Jackson Laboratory in the USA. As I look back over the past eight years, I am enormously proud of the deep and rich international networks we have built together. The confirmed funding for Australia's associate membership of the EMBL has reinforced my conviction that our current value and future potential has been recognised at the highest national level. I am immensely proud of what EMBL Australia has become— a thriving research organisation with strong local and international linkages.

Our flagship EMBL Australia Partner Laboratory program offers outstanding young scientists a secure funding and support base from which to establish their research. We now have eight Partner Laboratory Group Leaders, and 14 groups in total, including our node heads and collaborating groups across the three nodes of the Partner Laboratory.

With the expansion of the Partner Laboratory, we have also moved into new areas of life science. At Monash University, we continue with regenerative medicine but have also added groups who work in the area of structural biology and advanced molecular imaging. At UNSW, the emphasis is also on the use of advanced imaging techniques and single molecule science. Our node at the South Australian Health and Medical Research Institute (SAHMRI) applies systems biology approaches to issues of human health and infectious disease.

A highlight this year was the publication of research by Edwina McGlenn on the role microRNAs play in controlling gene expression during the formation of the skeleton. Edwina's research program is one that has benefited significantly from the EMBL model of secure long-term funding, which has allowed her to delve into the layers of regulatory control that direct skeletal formation in embryos. As with all of our research into fundamental biological processes, Edwina's findings may help in the future treatment of diseases.

I consider it to be a great achievement that our first 'graduate' from the program, Nicolas Plachta, has taken a senior research position at Singapore's Agency for Science Technology and Research. During his time at EMBL Australia, Nico received a number of awards and honours, including the Sylvia and Charles Viertel Fellowship in 2014, and his cutting-edge research program using live-imaging techniques to understand the behaviour of individual cells in the developing embryo has been widely published. I wish him the very best for this new stage in his career.

Our most established research node, based at Monash University, was reviewed by an independent panel of scientists this year. I am pleased to say that the panel praised the success of the node and each of its research teams. The node's two new group leaders, Max Cryle and Chen Davidovich, are building their research groups and programs. Node Head Peter Currie leads a strong node and provides excellent mentorship.

At SAHMRI, Ville-Petteri Mäkinen and David Lynn are well under way with their research programs under the leadership of Node Head Prof Steve Wesselingh. In Sydney, Maté Biro and Yann Gambin are establishing their research programs and teams at our newest node, led by Prof Kat Gaus at the Centre for Single Molecule Science, UNSW. This node was also the focus of our successful pilot EMBL Australia Partnership PhD Program.

I thank all who have worked to make EMBL Australia what it is today: our stakeholders (including the Australian Government, the European Molecular Biology Laboratory, Bioplatforms Australia, CSIRO, the Association of Australian Medical Research Institutes, Universities Australia and the Group of Eight universities); our researchers and staff; the EMBL Australia Council and committee members; and the leadership team.

I especially thank Prof Richard Larkins, the former Chair of EMBL Australia, and Executive Director Silvio Tiziani for the unwavering dedication they have provided to EMBL Australia.

**Prof Nadia Rosenthal**  
Scientific Head, EMBL Australia

## EMBL Australia – At a glance

Over 2015–16, 12 EMBL Australia Partner Laboratory groups were embedded in four institutions at three Australian nodes

89 research staff and  
42 students

Bioinformatics services and training from the Melbourne hub and eight interstate institutions, with links to international infrastructure

Linking Australian researchers to Europe and Asia

Training, travel support and international PhD opportunities for Australian students

Governed by a Council of representatives from CSIRO, Bioplatforms Australia, the Association of Australian Medical Research Institutes (AAMRI) and Universities Australia

Two EMBL–Australia Collaborating Groups





## Melbourne

### EMBL Australian secretariat

- The Australian Regenerative Medicine Institute at Monash University hosts the Secretariat, including administrative functions and student programs.

### Research groups

- Nadia Rosenthal (Scientific Head, EMBL Australia) is studying tissue repair following injury for possible application to regenerative medicine.
- Peter Currie (Victorian Node Head) is researching the molecular mechanisms that underlie patterning in vertebrate embryos.
- Edwina McGlenn is working to understand the genes controlling formation of the skeleton and neural circuits.
- Chen Davidovich is studying key proteins involved in regulating gene activity during embryonic development, and which play an important role in multiple cancers.
- Max Cryle is using a combination of techniques to understand and harness the major protein machines that catalyse the production of some of the most important antibiotics in clinical use.
- Nicolas Plachta is using non-invasive imaging techniques to see how proteins control the development of early embryos (until Sep 2015).

### EMBL–Australia Collaborating Group

- James Bourne (Monash University) and Cornelius Gross (EMBL Monterotondo) are anatomically mapping innate fear pathways.

### Initiatives

- SBI Australia is introducing systems biology to Australian researchers
- The EMBL Australia Bioinformatics Resource, based at The University of Melbourne, provides access to international and Australian life science data, plus training and user support, and contributions to the global biomolecular information infrastructure in a way which showcases Australian science.

It has networked service providers in Queensland (Queensland Cyber Infrastructure Foundation), Sydney (The University of Sydney School of Biological Sciences and Sydney Medical School), Western Australia (Centre of Excellence in Plant Biology), Adelaide (University of Adelaide, Flinders University and SAHMRI) and Tasmania (Menzies Research Institute).

## EMBL Australia Student Program

- The EMBL Australia Student Program provides training and support, giving students a head start in their science careers.

## Adelaide

### Research groups

The South Australian node of EMBL Australia at the South Australian Health and Medical Research Institute (SAHMRI) hosts two groups, with plans for this to increase to three in 2016. The groups are jointly supported by the University of Adelaide, University of South Australia and Flinders University.

- Steve Wesselingh (South Australian Node Head) is interested in neurovirology, HIV and vaccine development.
- David Lynn is investigating the regulation of the innate immune system from a genome-wide or systems level perspective.
- Ville-Petteri Mäkinen is using big data to better understand pathologic phenomena at the intersection of aging, obesity, diabetes and cardiovascular disease.

## Sydney

### Research groups

- Katharina Gaus (NSW Node Head) is using single molecule approaches to understand how T cells initiate immune responses.
- Marcus Heisler (University of Sydney, currently based at EMBL in Heidelberg) is looking at a fundamental question in plant developmental biology: how specialised tissues and organs become differentiated from embryonic cells and arranged into the stems, leaves and other structures as plants grow.
- Yann Gambin (UNSW Australia, Centre for Single Molecule Science) is combining single molecule detection and microfluidics to develop a microscopy based pipeline to readily study protein-protein interactions at high resolution.
- Maté Biro (UNSW Australia, Centre for Single Molecule Science) is studying actomyosin mechanisms during cytotoxic T cell action and the elucidation of biomechanical cell-cell interaction between T and target cancer.

## Canberra

### EMBL–Australia Collaborating Group

- Thomas Preiss (Australian National University) and Matthias Hentze (EMBL Heidelberg) are researching microRNA biology and gene regulation.





## Life sciences research

### RESEARCHING THE INTRICATE WORKINGS OF GENES, CELLS AND TISSUES USING NEW TECHNOLOGIES AND COMPUTATIONAL TOOLS

Life sciences have entered a new age, where researchers can delve deeper than ever before into the intricate workings of genes, cells and tissues. Life sciences research is evolving to exploit new technological advances in molecular, cellular and organismal biology, and to develop the computational tools necessary to handle the datasets being generated with these new approaches.

EMBL Australia is at the cutting edge of life sciences research in Australia. Our research teams are:

- looking deep into the molecules, cells and genes of animal embryos and plant seedlings to track how different tissues and organs develop, which could pave the way for future regenerative medicine
- using a systems approach to comprehensively investigate metabolic processes and immune responses
- using advanced imaging techniques to tease apart molecular interactions underpinning key cellular processes during development and beyond
- developing the bioinformatics tools and skills required to analyse large datasets and ensuring that they are available to all Australian researchers.

## Associate membership of EMBL

In March 2008, Australia accepted an invitation to become the first associate member of the renowned European Molecular Biology Laboratory (EMBL, see box). Australia was extended this honour in recognition of its strengths in many facets of the life sciences including cell biology, stem cells and regenerative medicine, chemical biology, plant biology, genetic epidemiology and clinical research.

EMBL Australia was launched in 2010 to take full advantage of this unique membership, with the goal of strengthening Australia's global position in life sciences research with a research model that is new to Australia—focusing on nurturing early-career scientists and making the most of Australia's scientific infrastructure.

EMBL Australia creates opportunities for:

- internationalising Australian research
- empowering and training Australia's best early-career researchers and research leaders
- embedding powerful new enabling tools, such as bioinformatics and systems biology, in Australian life sciences.

In 2015, the Australian Government and EMBL Council agreed to extend Australia's associate membership to EMBL, subject to annual approval by the EMBL Australia Council. Membership is managed by the Australian Government's Department of Education and Training.



## EMBL, the European Molecular Biology Laboratory

EMBL is Europe's flagship for the life sciences. Its founders had a vision of a supranational research centre to redress the imbalance caused by US domination of molecular biology.

EMBL was founded in 1974 and is funded by contributions from its 21 European member states and two associate member states, Australia and Argentina.

With nodes in Hinxton (near Cambridge, UK), Grenoble (France), Heidelberg and Hamburg (Germany), and Monterotondo (near Rome, Italy), EMBL comprises more than 80 independent research groups and 1600 people from 60 nations. The interdisciplinary and international connections created by EMBL allow individual states to achieve goals otherwise beyond their reach.

The cornerstones of EMBL's mission are to:

- perform basic research in molecular biology
- train scientists, students and visitors at all levels
- offer vital services to scientists in the member states
- develop new instruments and methods
- actively engage in technology transfer.

Among its many features are:

- nine years of funding security for research leaders (subject to performance), after which they move on
- training for young researchers
- highly sought postdoctoral positions
- internationalising research networks across Europe and around the world
- a culture that focuses on mentoring and supporting young scientists and builds strong research alliances.

## Internationalising Australian research

### EMBL AUSTRALIA CREATES HIGHLY COMPETITIVE RESEARCH TEAMS THAT ARE NETWORKED ACROSS THE NATION AND WITH EUROPE AND ASIA

Through the associate membership, EMBL Australia links Australian researchers to international powerhouses of life sciences research:

- EMBL, which jointly supervises Australian PhD candidates (through the International PhD program) and hosts early-career scientists (through the Faculty Development Program). EMBL also invites Australian PhD students to visit for conferences, training or study visits and encourages collaborations between Australian researchers and their EMBL counterparts.
- EMBL–EBI (the EMBL European Bioinformatics Institute) and other international research infrastructures (such as ELIXIR in Europe) that exchange bioinformatic data with the Australian life sciences community through the EMBL Australia Bioinformatics Resource.

These connections let EMBL Australia create highly competitive research teams that are networked across the nation and with Europe and Asia.



## Empowering and training young researchers

EMBL Australia mentors and nurtures outstanding young scientists selected from an international pool by offering solid funding to drive the development of new research and providing opportunities for students to enhance their scientific training through travel and networking.

### Research groups

#### IN THE EMBL AUSTRALIA PARTNER LABORATORY, TALENTED YOUNG SCIENTISTS SECURE UP TO NINE YEARS' RESEARCH FUNDING

EMBL Australia's flagship program is its research program, the EMBL Australia Partner Laboratory, which follows the EMBL model in providing talented young scientists with up to nine years of secure funding. The scientists are embedded within existing research institutes and universities.

EMBL Australia plans to work with its members and others to create up to 20 research groups around Australia, offering hosting institutions access to the scientific excellence and scientific governance that drives EMBL and EMBL Australia.

EMBL Australia has also developed the EMBL–Australia Collaborating Groups program, which recognises significant collaborations between Australian research leaders and EMBL scientists in Europe. Currently two Australian research teams, led by Prof Thomas Preiss at the Australian National University and Prof James Bourne at the Australian Regenerative Medicine Institute, Monash University, are recognised as EMBL–Australia Collaborating Groups.

### Supporting students with training, grants and internships

EMBL Australia has developed training programs for PhD students and funds travel grants for students to attend international conferences and workshops and to visit EMBL laboratories in Europe.

Australian students now have the opportunity to apply to study in a fully funded PhD program at EMBL. In addition, EMBL Australia has launched a pilot program for top international and Australian PhD students to complete their PhD studies within EMBL Australia groups.

## Embedding new enabling tools into Australian life sciences

### CREATING AND SHARING LIFE SCIENCES RESOURCES

EMBL Australia is committed to creating and sharing life sciences resources with the Australian life sciences community.

EMBL Australia's initiatives include:

- the EMBL Australia Bioinformatics Resource, led by Assoc Prof Andrew Lonie and based at the Victorian Life Science Computation Initiative (VLSCI), University of Melbourne, with networked service providers in across Australia. EMBL–ABR enables optimal exploitation of the tools and data of bioinformatics by Australian scientists and contributes to the global biomolecular information infrastructure in a way which showcases Australian science
- SBI Australia, which promotes transnational systems biology research through the sharing of scientific technology, resources and expertise
- links with the Australian Bioinformatics and Computational Biology Society (ABACBS), through which EMBL Australia is able to support bioinformatics initiatives such as the Winter School in Mathematical and Computational Biology and BioInfoSummer.

EMBL Australia also supports life sciences research by undertaking joint activities and sharing resources and expertise with a number of affiliate organisations.

## 2015–16 Highlights

In 2015–16, EMBL Australia consolidated its position as a significant player in Australia's life sciences research community: renewing its membership of EMBL; expanding its fundamental biomedical research; continuing its renowned training and support of early-career scientists; establishing the bioinformatics resource at its new location in Melbourne; and enhancing links between Australian scientists and their international peers.

### Securing a bright future

EMBL Australia grew significantly in 2015–16, expanding from seven research teams in March 2015 to eleven in February 2016, and receiving a significant injection of funding from the Australian Government via the National Collaborative Research Infrastructure Strategy (NCRIS).

#### EMBL AUSTRALIA GREW FROM SEVEN RESEARCH TEAMS TO ELEVEN.

The \$4 million NCRIS funding covers the membership fee for Australia's associate membership of EMBL, which was renewed in June 2015.



*Prof Nadia Rosenthal*

Following a comprehensive internal review, EMBL Australia restructured its governing body, the EMBL Australia Council, to fully represent Australia's biomedical research community. The new council comprises nominees from Universities Australia, the Association of Australian Medical Research Institutes, CSIRO and Bioplatforms Australia.

#### THE EMBL AUSTRALIA COUNCIL NOW FULLY REPRESENTS AUSTRALIA'S BIOMEDICAL RESEARCH COMMUNITY.

In December, Prof Richard Larkins stepped down as Chair of the EMBL Australia Council after steering EMBL Australia as its inaugural Chair from 2009. He was succeeded by Prof Brandon Wainwright, nominee of Universities Australia and Director of Queensland's Institute of Molecular Bioscience.

Expressions of interest were sought for a host institution to provide a home for the EMBL Australia Secretariat and to appoint a new scientific head to replace Prof Nadia Rosenthal, who accepted a position as head of The Jackson Laboratory in the USA.

The Bioinformatics Resource Australia EMBL (BRAEMBL) relocated to the Victorian Life Science Computation Initiative at The University of Melbourne, and in February 2016 was renamed EMBL Australian Bioinformatics Resource (EMBL-ABR).



*Prof Richard Larkins*



## Internationalising Australian research

EMBL Australia received visitors from international collaborating partners and EMBL scientists and the German Embassy in Australia:

- EMBL–Australia Collaborating Group Leaders, Prof Thomas Preiss (Australian National University) and Prof James Bourne (Australian Regenerative Medicine Institute, Monash University) hosted visits to EMBL Australia by their respective collaborating partners, EMBL Director Matthias Hentze (EMBL Heidelberg) and Cornelius Gross (EMBL Monterotondo).
- EMBL Australia hosted a visit from the Science Counsellor for the German Embassy in Australia, Dr Judith Reinhard.
- Dr Cornelius Gross and Dr Donal O’Carroll (both from EMBL Monterotondo, Italy) attended the 3rd Annual EMBL Australia PhD Course as plenary speakers.

## EMBL AUSTRALIA SCIENTISTS GAVE 21 INVITED CONFERENCE PRESENTATIONS AND SEMINARS INTERNATIONALLY, TRAVELLING TO NORTH AMERICA, EUROPE, ASIA AND THE MIDDLE EAST.

The EMBL Australia Bioinformatics Resource further developed the strong relationship between Australian scientists and the global bioinformatics community:

- Director Assoc Prof Andrew Lonie visited bioinformatics centres in Europe including EMBL–EBI and several of the nodes of the ELIXIR program, the pan-European research infrastructure for biological information. EMBL–ABR has been invited to be an observer at the 2016 ELIXIR meetings.
- EMBL–ABR hosted Dr Niklas Blomberg, Director of ELIXIR, on a national visit to meet Australian bioinformaticians and policymakers and discuss Australia’s participation in this important European data sharing initiative.
- The appointment of Assoc Prof Vicky Schneider as Deputy Director of EMBL–ABR links the resource to an extensive international network of bioinformatics training and activity.
- EMBL–ABR supported Dr Annette McGrath, Data61, CSIRO, to attend the GOBLET (Global Organisation for Bioinformatics Learning Education and Training) AGM in South Africa.

## ANNETTE MCGRATH SUCCESSFULLY BID FOR THE 2016 GOBLET AGM AND WORKSHOPS TO BE HELD IN BRISBANE IN NOVEMBER 2016, JOINTLY SPONSORED BY EMBL–ABR, BIOPLATFOMRS AUSTRALIA AND CSIRO.

- Dr Geraldine Van der Auwera from the Broad Institute, US, and Dr Mathieu Bourgey from McGill University and Genome Quebec, Canada, visited Australia to help run Bioplatforms Australia training courses in cancer genomics.

An international panel reviewed the Victorian Node of the EMBL Australia Partner Laboratory in October 2015 and praised both the science and management of the node.

Opportunities were provided for high-calibre Australian and international students to study and travel:

- The EMBL Australia Partnership PhD Program enrolled three international students in the first batch of four PhD students.
- EMBL International PhD student, Simone Li, is in the third year of her PhD at EMBL Heidelberg.
- Ten Australian PhD students received travel grants to attend the 17th Annual EMBL PhD Symposium in Heidelberg in October.

SBI Australia continued to work with parent institute the Systems Biology Institute in Japan.



## Empowering and training Australia's best early-career researchers and research leaders

### Research

EMBL Australia appointed six new group leaders (three in Victoria, two in New South Wales and one in South Australia) and a head of the South Australian node:

### PROF STEVE WESSELINGH WAS APPOINTED HEAD OF THE SOUTH AUSTRALIAN NODE AT SAHMRI.

- Drs Yann Gambin and Dr Maté Biro joined EMBL Australia's NSW node at the Centre for Single Molecule Science at UNSW.
- Dr Chen Davidovich and Dr Max Cryle joined EMBL Australia's Victorian node at Monash University, based in the Department of Biochemistry and Molecular Biology.
- Dr Mikaël Martino was appointed as a group leader in the Victorian node, based at the Australian Regenerative Medicine Institute, Monash University. He will relocate in March 2016.
- Dr Pirjo Apaja was appointed to EMBL Australia's South Australian node at SAHMRI. She will relocate in April 2016.

WITH THE APPOINTMENTS OF DRS DAVIDOVICH AND CRYLE AT MONASH UNIVERSITY AND DRS GAMBIN AND BIRO AT UNSW, UNDER NODE HEAD PROF KAT GAUS, EMBL AUSTRALIA IS NOW STRONGLY AFFILIATED WITH THE ARC CENTRE OF EXCELLENCE IN ADVANCED MOLECULAR IMAGING (IMAGING COE).

EMBL Australia scientists published 53 papers and four book chapters in the calendar year 2015:

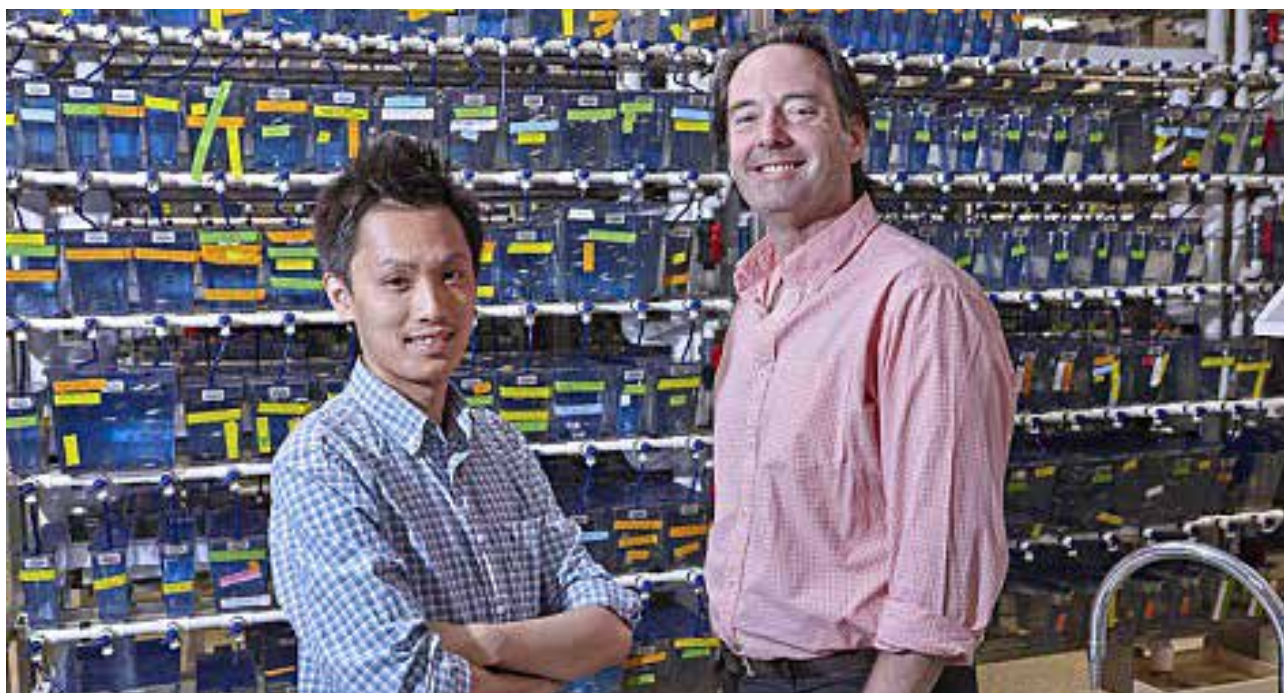
- Papers with EMBL Australia scientists as first or last author were published in high-impact journals such as *Cell Metabolism*, *Proceedings of the National Academy of Sciences*, *Developmental Cell* and *Current Biology and Trends in Cognitive Science*.
- Edwina McGlinn published a key paper giving insight into how the body shape of different animals evolved. The research, published in PNAS, showed that deactivation of a group of microRNA genes disrupted the correct formation of the backbone in mice during embryonic development.

EDWINA MCGLINN'S RESEARCH IS A 'MAJOR ADVANCE IN HOX GENE REGULATION AND WILL HAVE A SIGNIFICANT IMPACT ON THE FIELD'. VICTORIAN NODE REVIEW



Dr Steve Wesselingh. Credit: SAHMRI





Phong Nguyen and Peter Currie

- Nicolas Plachta published, in *Developmental Cell*, a new and non-invasive imaging technique to visualise embryo formation in living mammalian embryos.

EMBL Australia's research continues to attract significant grant funding:

- Twelve new grants to EMBL Australia scientists commenced in 2015: three from the National Health and Medical Research Council (NHMRC), three from the Australian Research Council (ARC) and others from The Pratt Foundation, the Muscular Dystrophy Association (USA) and the Sylvia & Charles Viertel Charity Foundation.
- Another 34 ongoing grants supported our research, including from the NHMRC (18), ARC (7), European research funding organisations (5) and other Australian organisations (4).

**DAVID LYNN SECURED HIS FIRST NHMRC GRANT AS A CHIEF INVESTIGATOR TO RESEARCH THE IMPACT OF THE NEONATAL GUT BIOME ON VACCINE RESPONSES. IT IS ONE OF TWO NHMRC CHIEF INVESTIGATOR GRANTS AWARDED TO DAVID IN 2015 (TO START IN 2016).**

While new group leaders are beginning, two long-standing EMBL Australia members are moving on:

- Scientific Head Prof Nadia Rosenthal accepted a position as Scientific Director of The Jackson Laboratory in the USA, but will retain a link to EMBL Australia with an honorary professorship at Monash University.
- Group Leader Dr Nicolas Plachta accepted a position at Singapore's Agency for Science Technology and Research (A\*STAR) as a senior principal investigator in the Institute of Molecular and Cell Biology.

EMBL Australia introduced around 100 early-career researchers to the programs and capabilities of EMBL Australia and its initiatives at a Showcase at Melbourne's Bio21 Institute.

EMBL Australia staff were recognised in two awards.

- Prof Nadia Rosenthal was named a Fellow of the Australian Academy of Health and Medical Sciences.
- Prof Peter Currie and postdoctoral researcher Phong Nguyen were in the team awarded the 2015 *University of New South Wales Eureka Prize for Scientific Research* for their research on 'buddy cells' that trigger the development of blood stem cells.

## Student programs

EMBL Australia launched a pilot EMBL Australia Partnership PhD Program in conjunction with UNSW, enrolling four students who will receive support from their supervisors to attend EMBL symposia and courses.

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### THE FIRST PHD STUDENTS ENROLLED UNDER THE EMBL AUSTRALIA BRAND BEGAN THEIR STUDIES AT UNSW AT THE START OF 2016.

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Two successful events brought together life sciences postgraduate students from around Australia:

- The 3rd Annual EMBL Australia PhD Course was held at the Harry Perkins Institute of Medical Research in Perth, Western Australia, from 22 June to 3 July 2015.
- The 2nd Annual EMBL Australia PhD Symposium, which is organised for and by students, was held at the Bio21 Institute in Melbourne in November 2015.

EMBL Australia provided support to the Winter School in Mathematical and Computational Biology and BioInfoSummer.



## Embedding powerful new enabling tools in Australian life sciences

EMBL–ABR provides in-demand services and training for Australian biologists and computational scientists:

- In its new home, EMBL–ABR provides Australian researchers with access to the VLSCI high-end systems along with over 240 software programs used in life sciences research, technical experts and bioinformatics training and expertise.
- EMBL–ABR is collaborating with the ELIXIR Tools and Data Services Registry in the collection and dissemination of Australian bioinformatics tools as well as tools relevant for the Australia life science researchers.

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### THE GENOMICS VIRTUAL LABORATORY IS DESIGNED TO TAKE THE IT OUT OF BIOINFORMATICS—FOR USERS WITHOUT PROGRAMMING EXPERIENCE.

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- The Genomics Virtual Laboratory platform for research and training was successfully rolled out, and will deliver much of the training to be delivered. The Australian Bioinformatics Resource hosted a series of workshops on the Genomics Virtual Laboratory and the US-based Galaxy platform in both Melbourne and Sydney.
- EMBL–ABR is building a national network of service providers at nodes across Australia.

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### EMBL–ABR PLAYS A LEADING ROLE IN TRAINING AUSTRALIAN LIFE SCIENTISTS HOW TO PRESERVE, MANAGE AND CURATE BIOINFORMATICS DATA ACCORDING TO INTERNATIONAL STANDARDS.

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The expansion of EMBL Australia's Partner Laboratory brought new techniques and technologies to the EMBL Australia scientists, including single molecule science at the NSW node, and advanced imaging technology at the Victorian node.

EMBL Australia supported ABACBS 2016, the national conference for the Australian Bioinformatics and Computational Biology Society.

## 2016–17 Outlook



Throughout 2016–17, EMBL Australia will continue to strengthen its role as a leader within the Australian research community and to build Australia's research collaboration with international institutions.

### Internationalising Australian research

EMBL Australia will:

- build on its strong links with European researchers and research agencies through its associate membership to EMBL
- continue its engagement with EMBL through visits and programs such as the Collaborating Groups program, which helps to facilitate collaborations between Australian and EMBL research groups
- continue to support Australian PhD students to attend the EMBL PhD Symposium, offering ten places in 2016.

The Bioinformatics Resource will:

- continue to develop its capacity to share data generated in Australia with scientists around the world
- develop links between Australia's bioinformatics and research communities and international bioinformatics initiatives such as ELIXIR.

SBI Australia will:

- continue to work with SBI Japan to back up and mirror important databases and systems
- appoint a new academic director to expand and build on the established research program.



Mikaël Martino

### Empowering and training Australia's best early-career researchers and research leaders

EMBL Australia will:

- appoint a new scientific head and determine the ongoing location for the secretariat
- launch the EMBL Australia Partnership PhD Program nationally
- welcome two newly appointed group leaders, Mikaël Martino and Pirjo Apaja, to the EMBL Australia Partner Laboratory
- appoint two new group leaders at the Victorian node in conjunction with CSIRO
- continue discussions with Australian research institutions interested in establishing additional nodes and groups
- hold the second EMBL Australia Showcase, at the Australia National University in Canberra, to introduce early-career researchers to EMBL Australia's research and the benefits of EMBL Australia's connections to the European Molecular Biology Laboratory
- continue support for the student-run EMBL Australia PhD Symposium, the Winter School in Mathematical and Computational Biology and BioInfoSummer.

The Bioinformatics Resource will:

- continue to provide training programs to introduce new and useful technologies to Australian life scientists and bioinformaticians
- explore the training and skill-development needs for Australian bioinformaticians
- engage with industry to identify and support the transferable skills in bioinformatics that are increasingly relevant to both academia and industry.
- work with Australian researchers to provide state-of-the-art bioinformatics solutions and support.

SBI Australia will:

- continue recruitment activities to appoint a director to lead SBI Australia.

## Embedding powerful new enabling tools in Australian life sciences

EMBL Australia will:

- continue to support Australian bioinformatics, including the 2016 ABACBS Conference. This conference will be held as part of a festival of events, including B3 (QUT's annual Big Biology and Bioinformatics symposium), the GOBLET AGM and COMBNE (ABACBS's official student subcommittee), from 31 October to 9 November at the Queensland University of Technology in Brisbane
- embrace, introduce and develop new technologies and tools for life scientists through its research programs, collaborations and associations.

The Bioinformatics Resource will:

- build on its existing base of services to provide the Australian bioinformatics community convenient access to its services
- continue to work with Australian research groups and consortia to assist with data collection and collation, curation and integration into globally accessible biomolecular databases.

SBI Australia will:

- expand on its research programs once a director has been appointed.



# The EMBL-Australia Relationship



## PERSONNEL/EXPERTISE EXCHANGE

**67**

EMBL ALUMNI  
RESIDING/WORKING  
IN AUSTRALIA

13 AUSTRALIANS  
WERE WORKING AT  
EMBL IN 2015



2015

## ACCESS TO WORLD CLASS RESEARCH INFRASTRUCTURE AND SERVICES

IN 2015  
THERE WERE  
3 AUSTRALIAN  
USER VISITS TO  
EMBL OPERATED  
BEAMLINES

**27m** WEB HITS TO  
THE EMBL-EBI  
FROM AUSTRALIA

AUSTRALIA IS ONE  
OF THE MOST INTENSE USERS OF  
THE EMBL-EBI DATABASE IN TERMS  
OF UNIQUE USER NUMBERS FROM  
THE EMBL MEMBER STATES

**88k** UNIQUE HOSTS FROM  
AUSTRALIA ACCESSING  
THE EMBL-EBI SERVICES

## TRAINING

**334**

SCIENTISTS FROM AUSTRALIA  
ATTENDED CONFERENCES  
COURSES AND CONFERENCES  
IN 2014 AND 2015

AUSTRALIA IS ONE OF  
THE TOP PARTICIPATING  
COUNTRIES

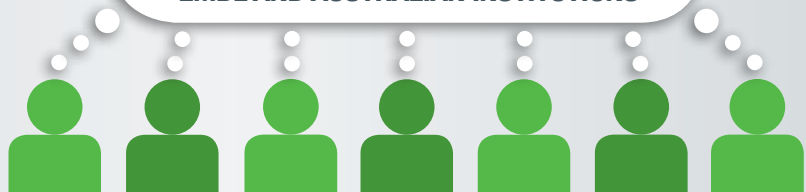
EMBL PERSONNEL  
PARTICIPATED IN AUSTRALIAN  
BASED TRAINING PROGRAMS  
AND COURSES INCLUDING:

- INTRODUCTION TO  
METAGENOMICS  
(SYDNEY AND MELBOURNE)
- EMBL AUSTRALIA PHD  
COURSE (CANBERRA)

## SCIENTIFIC COLLABORATIONS

RESEARCHERS FROM EMBL AND  
AUSTRALIA PARTNERED WITH  
7 AUSTRALIAN INSTITUTIONS ON  
10 GRANTS THAT WERE FROM  
THE EC OR FROM PHILANTHROPY

THERE WAS A TOTAL OF 27 PUBLICATIONS  
RESULTING FROM COLLABORATION BETWEEN  
EMBL AND AUSTRALIAN INSTITUTIONS



As an associate membership of EMBL, Australia has actively developed collaborative links between the Australia life sciences research community and EMBL—sharing ideas, expertise, facilities and training.

## Personnel/expertise exchange

67 EMBL alumni live or work in Australia

13 Australians were working at EMBL in 2015

## Training (2014 and 2015)

334 Australian scientists attended EMBL courses and conferences over the last two years: 190 at EMBL sites, 144 at external locations.

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## AUSTRALIA IS ONE OF THE TOP PARTICIPATING COUNTRIES

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EMBL personnel participated in Australian-based training programs and courses including:

- Introduction to Metagenomics (Sydney and Melbourne): 56 people, organised jointly by Bioplatforms Australia, CSIRO and EMBL-EBL
- EMBL Australia PhD course (Perth)

Over 20 Australians have also taken other training opportunities through the European Learning Laboratory for the Life Sciences and the EMBL Visitor Programme.

## Scientific collaborations

There was a total of 27 publications resulting from collaboration between EMBL and Australian institutions. Researchers from 7 Australian institutions partnered with EMBL scientists on 10 research grants over 2014 and 2015.



# Life Science Research Programs



## Rosenthal Group (EMBL Australia Scientific Head)

***Nadia Rosenthal** was the founding Scientific Head of EMBL Australia. In July 2015, she took up the position of Scientific Director of The Jackson Laboratory in Maine, USA. She retained her role as Scientific Head of EMBL Australia until the end of the reporting period.*

### **NADIA ROSENTHAL WILL RETAIN AN HONORARY PROFESSORSHIP AT MONASH UNIVERSITY AND A SMALL LABORATORY, REFLECTING HER DEEP INVESTMENT IN EMBL AUSTRALIA.**

The Rosenthal Group researched tissue repair after injury—assessing the role of growth factors, stem cells and the immune system for possible application to regenerative medicine. The group investigated the biology of heart and muscle development, ageing and degenerative disorders, using a combination of evolutionary, developmental and stem cell biology.

The group's approach was to intervene in the mechanisms at work in the mammalian response to damage or disease, focusing on heart and skeletal muscle. At the cellular level, the group seeks to reduce the impediments to effective regeneration by harnessing blood and tissue stem cell lineages to control inflammation and promote repair. Uncovering the molecular events leading to 'scarless' regeneration in diverse animal models will help recover their robust regenerative properties in our own bodies.

### **IN OCTOBER 2015, NADIA ROSENTHAL WAS ELECTED AS A FELLOW OF THE AUSTRALIAN ACADEMY OF HEALTH AND MEDICAL SCIENCES.**

## Victorian node

### Review of the Victorian node

#### **SCIENCE CONDUCTED AT THE VICTORIAN NODE IS EXCELLENT AND HIGHLY COMPETITIVE AT AN INTERNATIONAL LEVEL.**

A review of the Victorian node after five years of operation found it to be successful at both a collective and individual level and impressive in the level of science and the synergy between groups. The expansion of EMBL Australia to include structural biology (with new group leaders Max Cryle and Chen Davidovich being associate investigators at the Advanced Imaging Centre of Excellence) was seen as very positive. The panel also recommended expanding the node to six group leaders, including a replacement for Nicolas Plachta who has taken up a senior position at A\*STAR in Singapore.

The panel emphasised the value to Australian science of Australia's associate membership of EMBL. The EMBL branding and culture enhances the recognition and reputation of EMBL Australia's scientists and provides access to some of the world's best technology. A recommendation that postdoctoral fellows and postgraduate students working in EMBL Australia research groups be identified as EMBL Australia (in addition to their institution) will also be adopted.

The international review panel comprised:

- Prof Marianne Bronner (Chair), California Institute of Technology, Pasadena CA, USA
- Dr Anne Ephrussi, EMBL Heidelberg, Germany
- Prof Jenny Stow, Institute of Molecular Biosciences, The University of Queensland
- Prof John Carroll, Faculty of Biomedical Sciences, Monash University.

## Currie Group (Head, Victorian Node of the Partner Laboratory)

**Peter Currie**, Australian Regenerative Medicine Institute, Monash University, was appointed Head of EMBL Australia's Victorian node in September 2012.

The Currie Group is researching the molecular mechanism that acts to pattern the vertebrate embryo. They are particularly interested in how early embryonic cells become specific types of individual muscle cells later in development, how these cells grow and how they regenerate after injury. To do this, they study two muscles groups in zebrafish: the axial muscles, which form around the head and trunk, and the appendicular muscles, which form the muscles of the fins.

### IN FEBRUARY 2016, VICTORIAN NODE HEAD PETER CURRIE WAS ANNOUNCED AS THE NEW ARMI DIRECTOR AFTER AN EXTENSIVE INTERNATIONAL SEARCH.

The Currie Group is also researching the mechanics of stem cell generation to help find a cure for a range of blood disorders and immune diseases. In particular, they are researching the 'buddy' cells that seem to be the key to forming blood stem cells (haematopoietic stem cells), which replenish the body's supply of blood cells. In collaboration with researchers from the Garvan Institute of Medical Research, the Currie Group discovered that haematopoietic stem cells, which are found in the bone marrow and the umbilical cord, were formed with help from another type of cell—endotome cells.

### THE 'BUDDY CELL' DISCOVERY BRINGS US CLOSER TO A CURE FOR BLOOD DISORDERS AND WON THE PROJECT TEAM A 2015 EUREKA PRIZE (SEE BOX).

## Making blood on demand

'Buddy' cells that trigger blood stem cells to fully develop have been discovered by a team of Australian scientists. The finding, in zebrafish, may one day hold the key to creating blood on demand in the lab.

Everyday medical procedures can require litres of donated blood, and blood stem cells—which can turn into any one of the different types of blood cell—are often used in treatments for leukaemia, lymphoma and other blood cancers.

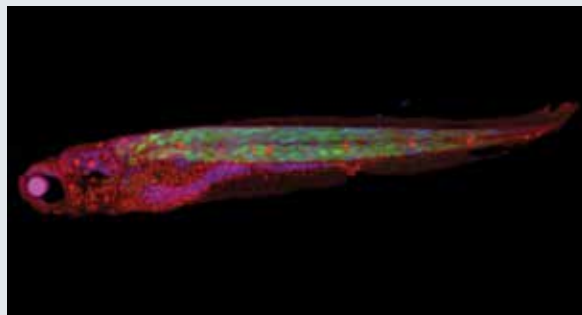
Currently, most human stem cells are taken from bone marrow and then grown in the lab.

'But they don't grow very well,' says Dr Phong Nguyen, whose PhD was the instigation of the research.

'We suspect it's the presence of these 'buddy' cells that helps them grow, so now we're looking for the signals they send, in the hope of one day developing a cure for a range of blood disorders and diseases.'

The team, led by Phong's supervisor Prof Peter Currie, and Dr Georgina Hollway of the Garvan Institute of Medical Research, has been awarded a grant from the NHMRC to extend the work to other animals.

They were awarded the 2015 *University of New South Wales Eureka Prize for Scientific Research* for the research, which was published in *Nature* in 2014.



The team discovered the buddy cells in zebrafish, whose transparent embryos allow observation of the development of internal structures. Credit: Phong Nguyen



## McGlinn Group (EMBL Australia Partner Laboratory, Victorian Node)

**Edwina McGlinn** joined EMBL Australia as a group leader in January 2011, based at the Australian Regenerative Medicine Institute, Monash University.

### IN OCTOBER 2015, EDWINA MCGLINN WAS AWARDED CONTINUATION FOR A FURTHER FOUR YEARS AS EMBL AUSTRALIA GROUP LEADER.

The McGlinn Group researches how genes govern the formation of the vertebrate skeleton. In particular, they study the control mechanisms responsible for patterning, such as the sequence of vertebrae in the backbone and the development of limbs, in the embryonic vertebrate skeleton. How patterns form depends on how particular cells develop into final cell types. With international colleagues, the team has discovered a group of microRNA molecules—named for their short length—that influence the expression of the genes directing vertebra development in mice (see box).

By studying the development of limb buds and the axial skeleton (the bones of the head and trunk), the McGlinn group aims to understand broader developmental processes. A limb bud is the structure that is responsible for stimulating limbs to develop. It also determines whether it will be a forelimb or a hind limb.

Ultimately, the team hopes to understand exactly how the genes work together to direct the development of the skeletal system. In turn this will provide a better understanding of the genetic controls underpinning embryonic developmental processes.

### Head to tail: the molecules that tell you how to grow a backbone

Growing the right number of vertebrae in the right places is an important job—and scientists have found the molecules that act like ‘theatre directors’ for vertebra genes in mice: telling them how much or how little to express themselves.

The finding may give insight into how the body shapes of different species of animals evolved, since the molecules under scrutiny are present in a wide range of animals, ranging from fish to snakes to humans.

An international team led by Dr Edwina McGlinn found that de-activating a small group of microRNA molecules sent things awry for different parts of the backbone.

They already knew that ‘Hox’ genes were crucial in determining vertebrae patterns—as well as playing an important role in the spinal cord and wider nervous system. But how these genes were regulated was still unclear.

‘We’ve found a mechanism that controls the correct transition from one area of the spine to another as it is forming,’ says Edwina.

The finding is part of a project by the McGlinn Group to build a more complete road map of how the size, shape and number of bones form within the early vertebrate embryo. This will contribute to the basic understanding of developmental processes, which in turn may assist in the treatment of a number of diseases and in regenerative medicine applications. For example, altered Hox gene expression is important in some forms of leukaemia, so it is critical to know all we can about how these genes are regulated.

‘The research is still in its early stages, but you’ve got to understand how an embryo forms before you can use that knowledge for medical or regenerative purposes,’ Edwina says.



Photo: Edwina and her team were able to visualise the formation of the skeleton, using stains for bone (red) and cartilage (blue). Credit: Edwina McGlinn

## Cryle Group (EMBL Australia Partner Laboratory, Victorian Node)

**Max Cryle** joined EMBL Australia in January 2016. He is based in the Department of Biochemistry and Molecular Biology at Monash University and is an associate investigator at the Australian Research Council Centre of Excellence in Advanced Molecular Imaging.

The Cryle Group aims to develop novel antibiotic therapies and to unlock new pathways to treat serious bacterial infections. To do this, they are seeking to understand how antibiotic compounds are made in nature and how these natural systems can be re-engineered to produce new antibiotics.

Antibiotics, which are largely derived from compounds found in nature, are one of the most important discoveries in human health. However, the early success of antibiotics has led to serious underinvestment in identifying new antibiotics and antimicrobial targets—most of the antibiotics in use today fall into one of several main classes based on their mechanism of action and/or chemical structure. The overuse of antibiotics in both medicine and agriculture has led to bacterial resistance and, as a result, many antibiotics have ceased to be effective. The emergence of bacterial strains with broad-spectrum resistance to many classes of antibiotics has catalysed the need for new and clinically effective antibacterial compounds.

The Cryle Group aims to understand the biosynthesis of one of the most important classes of clinically relevant antibiotics—the glycopeptide antibiotics (such as teicoplanin and vancomycin)—with the aim of re-engineering the biosynthetic processes involved to produce new antibiotic molecules. The group also researches novel antibiotic compounds and explores potential new targets for treating bacterial infections, particularly the serious bacterial pathogen golden staph (*Staphylococcus aureus*).

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**MAX CRYLE IS A MEMBER OF THE LOCAL ORGANISING COMMITTEE FOR 21ST INTERNATIONAL CONFERENCE ON CYTOCHROME P450, BRISBANE, AUSTRALIA 2019**

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## Davidovich Group (EMBL Australia Partner Laboratory, Victorian Node)

**Chen Davidovich** joined EMBL Australia in September 2015. He is based in the Department of Biochemistry and Molecular Biology at Monash University and is an associate investigator at the Australian Research Council Centre of Excellence in Advanced Molecular Imaging.

The Davidovich Group researches polycomb group (PcG) proteins, which play a role in epigenetic regulation of development and cancer. Within a cell, the DNA is packaged up into a complex structure called chromatin, which contains the chromosomal DNA plus proteins and RNA. Chromatin has a number of functions: it compacts the DNA, protects it from damage and assists with the control of gene expression and DNA replication.

The PcG proteins form chromatin-modifying complexes that interact with the chromatin to turn off or silence the expression of particular genes. The proteins play a vital role in embryonic development and cell differentiation, but have also been implicated in cancer. The Davidovich Group is using cutting-edge molecular techniques *in vivo*, in combination with structural biology, biochemistry and biophysics *in vitro*, to understand the detailed molecular events that underlie the recruitment and regulation of these chromatin-modifying complexes by their cofactor proteins, RNAs and DNA.

## Plachta Group (EMBL Australia Partner Laboratory, Victorian Node)

**Nicolas Plachta** joined EMBL Australia as a group leader in 2011, based at the Australian Regenerative Medicine Institute, Monash University. He left in September 2015 to take up a senior research position at the Institute of Molecular and Cell Biology at Singapore's Agency for Science, Technology and Research (A\*STAR).

The Plachta Group aimed to better understand how single cells behave in different parts of the embryo and how individual genes control cell dynamics in vivo.

Nicolas Plachta and his team pioneered techniques, such as tagging proteins with fluorescent dyes, that let them see the proteins that control gene expression (known as transcription factors) move around the cells of living mammalian embryos in real time. The group focused on transcription factor movements at the time the embryonic cell begins to differentiate into a more specialised cell lineage. Understanding these mechanisms is critical to understanding human biology and disease.

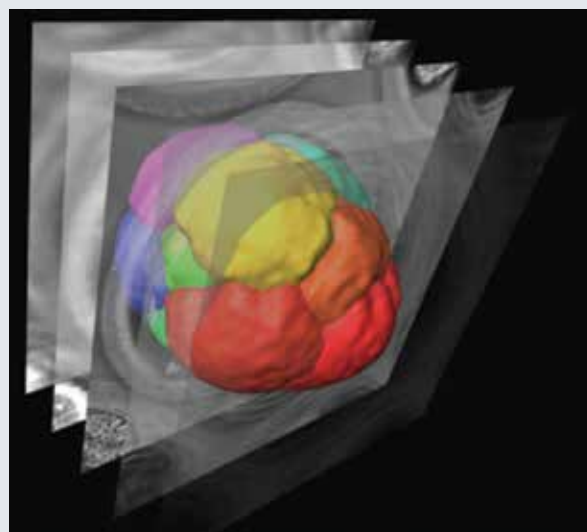
By studying differences in mobility (kinetics) of the transcription factors, the group could predict the developmental fate of cells. The group also used their live-imaging tools to understand how individual cells move and interact with each other to form the first tissue-like layers of the embryo.

## Seeing embryo formation could improve IVF success

A collaboration between biologists and engineers at Monash University has led to the development of a new non-invasive image processing technique to visualise embryo formation. Researchers were able to see, for the first time, the movement of all of the cells in living mammalian embryos as they develop under the microscope. This breakthrough has important implications for IVF (in vitro fertilisation) treatments and pre-implantation genetic diagnosis. In the future, this approach could help with embryo selection before the embryo is implanted back into the uterus to improve IVF success rates.

The research, published in *Developmental Cell*, and titled 'Cortical Tension Allocates the First Inner Cells of the Mammalian Embryo', provides new insights into embryo formation and challenges the prevailing model of cell placement through division. Four Plachta Group researchers were among the nine authors, including co-first author Melanie White.

'If, in the future, we can combine our new image processing technique with non-harmful dyes that can label the membranes of human embryos, we may be able to evaluate embryos used in IVF and decide which ones to implant to have the best chance of success,' said Melanie White.



[from Monash website – can we use it and get caption and photo credits?]





## New South Wales node

### Gaus Group (Head, New South Wales Node of the Partner Laboratory)

**Katharina (Kat) Gaus**, University of New South Wales, was appointed head of the EMBL Australia node at the Lowy Cancer Research Centre—the UNSW Centre in Single Molecule Science in 2014.

The Gaus Group want to know how T cells initiate an immune response. The decision of a T cell to activate or not to activate is determined by a complex signalling network within the cells. In this network, information is encoded not only in the components, but also by the frequency and duration of their interactions.

Studying how individual molecules within the cell control the actions of T cells is a fundamental single molecule problem. The Gaus Group is using new single molecule microscopes to understand the molecular basis of T cell decision-making, using strategies that combine mouse models with molecular biology, microscopy and mathematics (the 4 Ms).

They are focusing on the development of new super-resolution fluorescence microscopes and analysis routines to understand the decision-making processes of T cells. Single molecule data can provide a unique ‘bottom up’ perspective to T cell signalling networks in intact and live cells, and with new analysis strategies, a map detailing where signalling begins and how signals spread through the cells can be generated. Nanotechnology is used to control where and when T cells are stimulated.

## **Biro Group (EMBL Australia Partner Laboratory, New South Wales Node)**

***Maté Biro** joined the EMBL Australia node in Single Molecule Science in January 2016. He is also an associate investigator at the Australian Research Council Centre of Excellence in Advanced Molecular Imaging.*

The Biro Group researches the cell biology and mechanics of the actin cytoskeleton, microfilaments of actin proteins within the cell's cytoplasm that provide structure and allow movement. The group uses single molecule microscopes to observe the dynamics of actin, which is a major component of the cytoskeleton. Their multidisciplinary approach encompasses cell biology, biophysics, bioimage informatics and advanced light microscopy to unravel fundamental actin-based processes and develop new methodologies for basic cell biological research.

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### **MATÉ BIRO IS A MEMBER OF SYDNEY CATALYST (THE TRANSLATIONAL CANCER RESEARCH CENTRE OF SYDNEY AND NSW) AND THE CANCER RESEARCH NETWORK OF THE UNIVERSITY OF SYDNEY**

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Using high-speed imaging, the Biro Group is able to watch how cells move throughout complex 3-dimensional environments. Single molecule microscopes are used to observe the dynamics of actomyosin, a major, force-generating component of the cytoskeleton.

The group is using the techniques developed to study how immune cells (T cells) locate and kill cancer cells. They are investigating how the T cell's cytoskeleton drives the scanning for, and interacts with, tumour cells that have been located in the body.



## Gambin Group (EMBL Australia Partner Laboratory, New South Wales Node)

**Yann Gambin** joined the EMBL Australia node in Single Molecule Science in 2015. He is also and is an associate investigator at the Australian Research Council Centre of Excellence in Advanced Molecular Imaging.

The Gambin Group is using a novel, rapid approach to research how certain proteins clump together, leading to cell death and diseases affecting the brain, heart, muscles and other areas of the body.

By using a cell-free protein expression system, the proteins under study do not require separation and purification from other cellular material, speeding up the process by a factor of ten and better preserving the protein's structure and function.

The group is using new techniques in single molecule spectroscopy to observe how proteins cluster together to signal more efficiently (and how that is linked to pathologies and protein polymerisation) and the misfolding and pathological aggregation of proteins in neurodegenerative diseases, such as Parkinson's and Alzheimer's diseases.

Using these techniques, the Gambin Group is investigating how two protein adaptors, known as ASC and MAVS, can create massive protein aggregates with prion-like behaviours in immune cells. It is a process that may increase a cell's immune response against a viral infection.

## Heisler Group (EMBL Australia Partner Laboratory, New South Wales Node, based at Heidelberg, Germany)

*Marcus Heisler joined EMBL's Heidelberg laboratory as a group leader in 2009 through EMBL Australia's Faculty Development Program.*

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### MARCUS WILL RETURN TO AUSTRALIA IN 2016 TO CONTINUE HIS GROUP LEADER ROLE AT THE UNIVERSITY OF SYDNEY

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The Heisler Group is investigating developmental patterning in plants. They are looking at how embryonic cells differentiate into specialised tissues and organs and become arranged into stems, leaves and other structures as plants grow.

Leaves and other plant organs form different types of cell on the top (dorsal) and bottom (ventral) sides. The arrangement of these cell types also controls the way organs grow. If only one cell type is present, the leaf loses its flat lamina shape and instead develops as a rod-shaped structure. The Heisler Group is primarily interested in the mechanisms by which these cell types are established and how they control growth. So far they have observed the presence of both cell types in precursor tissues, suggesting a role for these tissues in organ initiation.

The group has made major progress in recent years, finding that plants may direct the growth and patterning of tissues surrounding their dorsiventral boundaries in a way that is functionally similar to boundary-based organising cells found in animals.



## South Australian node

### Wesselingh (Head, South Australian Node of the Partner Laboratory)

**Steve Wesselingh**, Executive Director of the South Australian Health and Medical Research Institute, was appointed head of the South Australian node of EMBL Australia in July 2015.

Steve Wesselingh is interested in neurovirology, HIV and vaccine development, an area in which he is collaborating with Partner Laboratory Group Leader David Lynn. Steve has consistently worked towards the integration of high quality medical research with health care delivery, leading to improved health outcomes for Australia and the poorly resourced countries of the region.

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**PIRJO APAYA WAS APPOINTED AS THE THIRD GROUP LEADER IN THE SOUTH AUSTRALIAN NODE. WHEN SHE STARTS IN APRIL 2016, HER GROUP WILL INVESTIGATE THE MECHANISMS OF ORGANELLE FUNCTION.**

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## Lynn Group (EMBL Australia Partner Laboratory, South Australian Node)

*David Lynn* joined EMBL Australia as a group leader in 2014. He is based in the Infection and Immunity Theme at SAHMRI.

The Lynn Group researches the regulation of innate immunity using in vitro and in vivo (mouse) experimental models coupled with systems biology approaches. Recently, the group has focused on the relationship between the immune system and the neonatal gut microbiome. The Lynn Group is also investigating two aspects of vaccines: their effect on mortality and morbidity independent of their role in preventing the targeted diseases; and how particular vaccines can assist immune cells to be more responsive to unrelated antigens.

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### THE LYNN GROUP ADMINISTERS THE SAHMRI HIGH PERFORMANCE COMPUTING SYSTEM THAT PROVIDES THE COMPUTATIONAL INFRASTRUCTURE FOR BIOINFORMATICS ACROSS SAHMRI

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The group also applies these integrative biology approaches to human health, with a particular interest in the role of microRNAs in regulating innate immunity networks. The Lynn Group develops novel computational analysis tools to facilitate this research, including new network analysis and visualisation tools. David continues to lead the development of InnateDB, a computational analysis platform for studying innate immune networks, and the computational biology aspects of the European Commission-funded PRIMES project that is investigating how to model, and subsequently therapeutically target, protein interaction networks in cancer.





## Mäkinen Group (EMBL Australia Partner Laboratory, South Australian Node)

**Ville-Petteri Mäkinen**, *Molecular Life Course Research Group Leader at SAHMRI, joined EMBL Australia as a group leader in 2014.*

The Mäkinen Group researches the molecular patterns of gene and protein expression that cause chronic and age-related conditions, such as obesity, diabetes and cardiovascular disease. As part of their research, the group develops and uses computational approaches to analyse the huge datasets generated by genomics, transcriptomics and metabolomics studies, looking for patterns linking genes and proteins to the physical characteristics of disease.

By integrating epidemiological and clinical data from large population studies with genomic and gene/protein expression data, the group can create hypotheses of possible disease mechanisms, which can then be tested and validated both in vitro and in live animal studies.

The Mäkinen Group combines the systematic analyses of multiple diseases and metabolic traits to get a detailed understanding of the molecular life paths of individuals and the context-dependent risk factors that predispose to morbidity in later life.

## EMBL–Australia Collaborating Groups



(L to R) James Bourne, Nadia Rosenthal and Thomas Preiss at the awarding of EMBL–Australia Collaborating Group status.  
Credit: Silvio Tiziani

## Preiss Group (EMBL–Australia Collaborating Group)

**Thomas Preiss**, *The John Curtin School of Medical Research, Australian National University*, is collaborating with EMBL Director **Matthias Hentze**, *EMBL Heidelberg*.

The Preiss Group studies the mechanisms and transcriptome-wide patterns of eukaryotic mRNA translation as one of life's core processes and its regulation by RNA-binding proteins and non-coding RNA (for example, microRNAs) as a means of controlling gene activity. Translation takes place on the ribosome, and is aided by numerous accessory factors. Control at this post-transcriptional level makes major contributions to gene regulation and its dysregulation is increasingly recognised as an important factor in human disease.

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**A PROTEIN CRITICAL FOR BREAST DEVELOPMENT AND MILK PRODUCTION WAS DISCOVERED BY A RESEARCH TEAM THAT WAS LED BY THE WALTER AND ELIZA HALL INSTITUTE AND INCLUDED THOMAS PREISS. THE RESEARCH, PUBLISHED IN NATURE CELL BIOLOGY, SUGGESTS THE PROTEIN MAY ALSO BE A TARGET FOR DEVELOPING ANTI-CANCER DRUGS.**

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Pathological mechanisms may perturb the activity of components of the translational machinery, which can have a broad impact on the cellular translation program (for example, leading to malignant transformation, inappropriate cell death or cardiac hypertrophy). Failure to properly regulate the translation of specific mRNAs is also linked to a growing spectrum of diseases.

The Preiss Group investigates post-transcriptional gene control in mammalian and yeast cell culture models using a mix of conventional molecular biology approaches as well as global methods, such as next-generation sequencing.

The collaboration with Matthias Hentze focuses on microRNA biology, identification of RNA-binding proteins and the potential links between intermediary metabolism and gene regulation via RNA-enzyme interactions.



## Bourne Group (EMBL–Australia Collaborating Group)

**James Bourne**, Australian Regenerative Medicine Institute, Monash University, is collaborating with Cornelius Gross, EMBL Monterotondo.

The Bourne Group researches visual neuroscience with a particular emphasis on development, plasticity and repair following injury. The understanding gained will help identify mechanisms relevant to both normal brain visual function and possible future repair and functional recovery of adult brains following an injury.

The team is interested in the pathways, mechanisms and factors, at both a cellular and system level, that underlie how the brain processes our rich visual environment. Their cell-to-system approach provides great insights into how the primate visual cortex has evolved to possess over 20 functionally unique areas, each with clearly defined boundaries.

The Bourne Group has begun to understand the mechanism of neuroplasticity in the developing visual brain and how this innate plasticity could aid rehabilitation from a brain injury. To this end, a model of stroke in the visual cortex of a nonhuman primate brain has been developed. The model provides an insight into the mechanisms that prevent the neocortex (a part of the brain that contains the visual cortex) from repairing or regenerating itself, especially in later life.

The collaboration with Cornelius Gross from the Monterotondo (Rome) outstation of the EMBL is centred on the anatomical mapping of innate fear pathways using anatomical tract tracing and in situ hybridisation experiments.

**JAMES BOURNE WAS ELECTED TO BE AN EDITOR OF THE NATURE PUBLISHING GROUP JOURNAL SCIENTIFIC REPORTS FOR HIS EXPERTISE IN NEUROBIOLOGY IN MARCH 2015**

### ‘Baby molecule’ halves scarring after stroke

A drug based on a molecule naturally present in infants—but which declines in adulthood—can halve the scarring in brains of those who have suffered stroke, even delivered up to a week afterward.

‘We hope our work will improve the recovery of the elderly, as well as people in rural and remote communities, who haven’t had access to speedy treatment following a stroke,’ says James Bourne, chief investigator of the research.

The current clot-busting drug, tPA, which can have harmful side effects including haemorrhages, is only given to the 10% of stroke patients who have had ischaemic strokes (those caused by a blood clot). If given within three hours of the stroke, it has a 35% success rate.

James and his colleague, Leon Teo, have now patented their molecule, which can extend the ‘window of opportunity’ for effective therapy by activating a pathway in the recovering brain that mimics a process that occurs in infants. Cells still create a barrier to infection and stabilise the wound after the stroke damage, but scarring in the brain is limited, which is likely to enhance recovery.

They hope to expand their pre-clinical trial and move to clinical trials soon, eventually applying the work to other brain injuries—for example, limiting damage from brain cancer removal or following traumatic accidents.

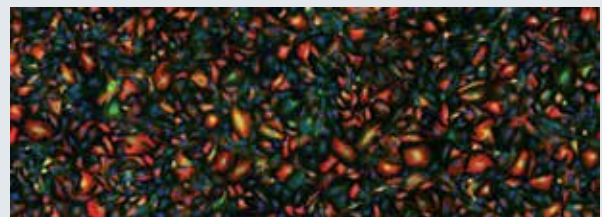
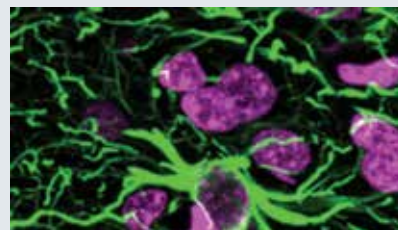


Photo: Following a stroke, astrocyte cells in the brain show increased reactivity. Credit: Leon Teo



Enlarged cell bodies (pink), with increased scarring (green), following stroke. Credit: Leon Teo

## Research ethics

All research undertaken by EMBL Australia staff, collaborators and students is conducted under the auspices of their university ethics procedures and abides by the relevant state or territory and commonwealth legislation, regulations and codes, as appropriate. Every project involving the use of animals in research is approved by the institution's animal ethics committee, which operates according to the *Australian code for the care and use of animals for scientific purposes* ([www.nhmrc.gov.au/guidelines-publications/ea28](http://www.nhmrc.gov.au/guidelines-publications/ea28)). Research involving genetic modification is authorised by, and managed according to the requirements of, the Office of the Gene Technology Regulator ([www.ogtr.gov.au](http://www.ogtr.gov.au)).

# Initiatives to Support Australian Life Sciences



## The EMBL Australia Bioinformatics Resource

### What is bioinformatics?

Bioinformatics and computational biology deal with the management, analysis and interpretation of biological information, especially at the molecular level. Modern life scientists generate huge amounts of data, ranging from relatively simple sequences of DNA and proteins to tracking the expression of biomolecules in cells and tissues over time and in response to stimuli. Bioinformatics provides the methods and software tools allowing researchers to interpret, analyse and understand large data sets.

Bioinformatics is interdisciplinary, combining computer science, mathematics and statistics and software development with life sciences.

The EMBL Australia Bioinformatics Resource (EMBL-ABR) is a distributed national research infrastructure providing bioinformatics support to life science researchers in Australia. It was set up as a collaboration with the European Bioinformatics Institute (EMBL-EBI) to maximise Australia's bioinformatics capability. This close partnership is made possible in the context of Australia's associate membership of EMBL.

### Objectives

EMBL-ABR aims to:

- increase Australia's capacity to collect, integrate, analyse, exploit, share and archive the large heterogeneous data sets now part of modern life sciences research
- contribute to the development of and provide training in data, tools and platforms to enable Australia's life science researchers to undertake research in the age of big data
- showcase Australian research and datasets at an international level
- enable engagement in international programs that create, deploy and develop best practice approaches to data management, software tools and methods, computational platforms and bioinformatics services.

## Origins of the Australian Bioinformatics Resource

Established in 2011 in Brisbane as the EMBL Australia Mirror of the EMBL-EBI, and later known as BRAEMBL (Bioinformatics Resource Australia EMBL), the resource provided local access to the EMBL-EBI databases and services. Many other bioinformatics services and tools were added over the first four years.

In 2013-14, as the initial funding period was coming to an end, Interim Director Graeme Cameron reviewed the services offered by the Bioinformatics Resource and the needs of Australian bioinformatics. He noted that faster internet speeds allowed Australian scientists direct access to EMBL-EBI's databases so there was no longer a need to mirror EBI's databases locally. He also noted that access to training and support for services were the most important factors in building Australia's bioinformatics capability and recommended a hub and spoke model, with nodes around Australia providing services, training and support.

Expressions of interest for a new host institution were sought and the move to the Victorian Life Science Computing Initiative (VLSCI), University of Melbourne, was announced in May 2015.

### New home at the VLSCI

From April 2015, the EMBL-ABR hub has been hosted at the VLSCI through a funding agreement between The University of Melbourne and Bioplatforms Australia, supported by new Australian Government research infrastructure funding through Bioplatforms Australia. This funding provides support for the EMBL-ABR Director and Deputy Director positions plus seed funding for national activities.

Assoc Prof Andrew Lonie was appointed as Director in April 2015 (and subsequently also appointed Director of VLSCI). In February 2016, Assoc Prof Vicky Schneider took up the position of Deputy Director EMBL-ABR.

**DEPUTY DIRECTOR VICKY SCHNEIDER WILL BUILD ON HER EXTENSIVE INTERNATIONAL NETWORKS TO ACCELERATE BIOINFORMATICS TRAINING AND ACTIVITY IN AUSTRALIA**



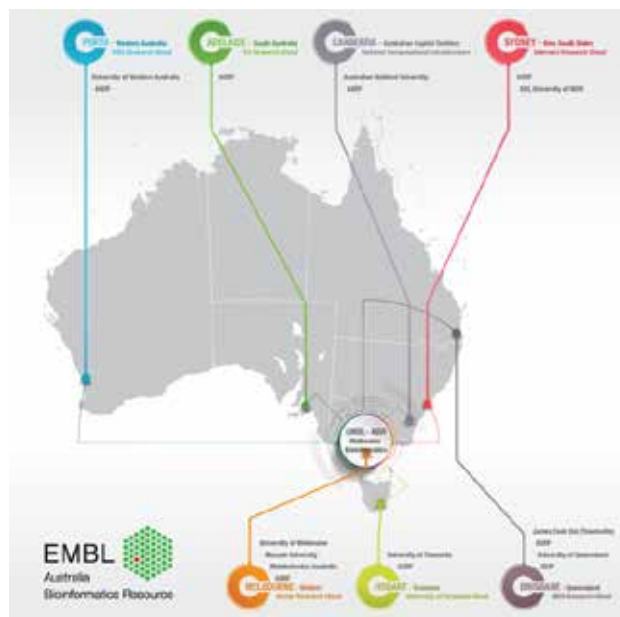
Vicky Schneider has come from the Genome Analysis Centre, UK, where she worked as Head of Scientific Training, Education and Learning. Before that she was responsible for the strategic coordination and implementation of the EMBL European Bioinformatics Institute's User Training program. Her extensive training networks and activities are vital to help EMBL-ABR grow Australian talent and contribute to the global data exchanges which have become the norm in biological research today.

In its new home, EMBL-ABR provides Australian researchers with access to the VLSCI high-end systems along with over 240 software programs used in life sciences research, technical experts and bioinformatics training and expertise.

Throughout 2015-16, EMBL-ABR has focused on addressing the increasing demand for training and skills development in bioinformatics while continuing to develop tools and resources for the Australian research community and its international collaborators. VLSCI and The University of Queensland have most recently successfully rolled out the Nectar-funded Genomics Virtual Laboratory and much of the training to be delivered will be offered on this platform. (Nectar is the National eResearch Collaboration Tools and Resources project, which provides online infrastructure to connect Australian scientists to each other and the global community. It is supported by the Australian Government through NCRIS)

**THE GENOMICS VIRTUAL LABORATORY IS ALREADY RECOGNISED AS AN AID TO ADDRESS THE SEVERE SHORTAGE OF BIOINFORMATICS EXPERTISE AROUND THE WORLD AND MANAGE THE COMPLEX, MULTIPLE-LAYERED DATA ANALYSIS TASKS CONFRONTING LIFE SCIENTISTS TODAY.**

The nodes of EMBL-ABR (in NSW, Queensland, Western Australia, South Australia and Tasmania, see Figure) provide training and researcher support, plus bioinformatics tools and platform access, modelled on the successful services delivered at VLSCI over the past five years. Local and national workshops are being rolled out across Australia. Some are being run by Bioplatforms Australia and CSIRO and some are being run by VLSCI bioinformaticians.



**Creating international links with ELIXIR (Europe) and Big Data to Knowledge (US)**

ELIXIR is a research infrastructure founded by 15 European countries and the EMBL-EBI, which was formed to orchestrate the collection, quality control and archiving of large amounts of biological data produced by life science experiments.

In November and December 2015, EMBL Australia Bioinformatics Resource and VSCLI brought ELIXIR Director Dr Niklas Blomberg to Australia to discuss Australia's participation in this important European data sharing initiative. The visit, which was supported by Bioplatforms Australia, strengthened existing connections and collaborations to drive quality Australian life sciences research.

Niklas Blomberg met with policymakers, representatives of funding bodies and senior researchers from many key life sciences institutions as well as giving public talks in Melbourne and Brisbane.

**'AUSTRALIA IN GENERAL, AND THOSE INSTITUTES I VISITED, ARE WELL PLACED TO SERVE THE BIOINFORMATICS NEEDS OF LOCAL USERS.'**  
**NIKLAS BLOMBERG**



Engagement with ELIXIR adds a vital link to existing international relationships and our bioinformaticians and research infrastructure policy leads are looking forward to seeing how to Australian researchers can work with ELIXIR to maximise connections to this important enterprise.

The US initiative towards a cloud-based 'data commons', Big Data to Knowledge (BD2K), was also discussed at a Canberra workshop, which was attended by US NIH Senior Adviser for Data Science Technologies, Dr Vivien Bonazzi, who had been a member of EMBL Australia's Bioinformatics Advisory Committee from 2012 to 2015.

### Training and education

EMBL-ABR plays a leading role in training Australian life scientists how to preserve, manage and curate bioinformatics data according to international standards. This enables Australian data, experience and best practice to be shared with international initiatives and provides Australian scientists with the skills required to access and use data shared by others in their research.

The EMBL-ABR training program tackles the training gaps identified in Graeme Cameron's 2013-14 review, with the aim of enabling sustainable and scalable bioinformatics use by life scientists across Australia. EMBL-ABR will also explore the training and skill-development needs for Australian bioinformaticians. Engagement with industry will identify and support the transferable skills in bioinformatics that are increasingly relevant to both academia and industry.

EMBL-ABR has established a number of collaborations and joined key global efforts in Bioinformatics Training and Education. EMBL-ABR is currently engaging with:

- the Gulbenkian Training Programme in Bioinformatics, Portugal
- bioinformatics and computational biology courses at the University of Cambridge, UK
- courses and workshops from EMBL Heidelberg and outstations, Europe
- ELIXIR IT (Train the Trainer Taskforce)
- CyVerse, USA

EMBL-ABR is also an active member of The Global Organisation for Bioinformatics Learning, Education & Training (GOBLET). EMBL-ABR supported Dr Annette McGrath, Data61, CSIRO, to attend the GOBLET AGM in South Africa in November 2015.

### THE GOBLET FOUNDATION PROVIDES A GLOBAL, SUSTAINABLE SUPPORT AND NETWORKING STRUCTURE FOR BIOINFORMATICS EDUCATORS/ TRAINERS AND STUDENTS/TRAINEES

With joint sponsorship from EMBL-ABR, Bioplatforms Australia and CSIRO, Annette McGrath successfully bid for the 2016 GOBLET AGM and workshops to be held in Australia. They will be held in conjunction with the annual bioinformaticians' (ABACBS) conference in Brisbane in November 2016. Workshops at the 2016 GOBLET meeting will be aimed at both bioinformatics trainers and biologists.

### Resources and services

The resource is now found at [www.embl-abr.org.au](http://www.embl-abr.org.au). EMBL-ABR is currently collaborating with the ELIXIR Tools and Data Services Registry in the collection and dissemination of Australian bioinformatics tools as well as tools relevant for the Australia life science researchers.

Many of the data resources and services formerly offered by BRAEMBL have been returned to their host institutions for management or discontinued:

- BRAEMBL data formerly hosted at [www.ebi.edu.au](http://www.ebi.edu.au) is still hosted at The University of Queensland (UQ).
- Access to the Ensembl Genome Browser is now through [asia.ensembl.org](http://asia.ensembl.org).
- Australian Species Data remains as is.
- The MEME Suite motif analysis tools, which were co-developed at UQ, are no longer being maintained on [ebi.edu.au](http://ebi.edu.au) and can be found on the cloud at [meme-suite.org](http://meme-suite.org).
- GT-Scan, which was developed in Australia, is now being hosted and maintained by Aiden O'Brien at CSIRO.
- The NCI-SF facility at UQ is now closed.

## SBI Australia

SBI Australia, a node of Japan's Systems Biology Institute, is an EMBL Australia initiative that develops and supports systems biology in Australia to tackle four major global problems:

- human health and wellbeing
- pressures around sustainable living
- food and water security
- quality of life for people everywhere.

---

**SYSTEMS BIOLOGY INTEGRATES LIFE SCIENCES RESEARCH WITH THE KNOWLEDGE, SKILLS AND TECHNOLOGY OF MATHEMATICS, ENGINEERING, COMPUTER SCIENCE, PHYSICS, CHEMISTRY AND LINGUISTICS TO UNDERSTAND, AT THE SYSTEM LEVEL, THE RULES AND PRINCIPLES THAT GOVERN, REGULATE AND DEFINE COMPLEX BIOLOGICAL SYSTEMS.**

---

SBI Australia contributes to systems biology by:

- facilitating the development of collaborative systems biology research and training across all the scientific disciplines
- linking national and international partners from research, government and industry
- facilitating access to Australia's high-performance computing capacity and software platforms and resources
- providing advocacy and advice on the national capacity for systems biology within an international context.

SBI Australia was established in 2012 through a formal agreement between the Systems Biology Institute in Japan and Monash University, where it became an EMBL Australia initiative based at the Australian Regenerative Medicine Institute.

SBI Australia has attracted national and international attention, with a number of exciting linkages and projects already under way. SBI Australia is actively seeking grants and funding for all of its programs.

SBI Australia is seeking to recruit a scientific director at Associate Professorial or Professorial level to build a systems biology research program at SBI Australia, which is hosted at the Australian Regenerative Medicine Institute, Monash University. Applications in various aspects areas of systems biology are welcome.

## Supporting Australian bioinformatics

EMBL Australia supports Australian bioinformatics by providing funds to the Australian Bioinformatics and Computational Society (ABACBS) to help continue the activities previously undertaken by the Australian Bioinformatics Network (which was established by EMBL Australia).

In 2015–16, funds were provided to:

- allow sponsorship of the annual bioinformatics training schools (the Winter School in Mathematical and Computational Biology and BioInfoSummer)
- contribute to the main bioinformatics communication portal (used by 700 members of the ABN)
- support the continued development of an annual Australian Bioinformatics Conference. The ABACBS Conference 2015 was held at the Garvan Institute in Sydney on 10–11 October 2015. Key speakers at the conference included Prof Martha Bulyk (Harvard, US), Assoc Prof John Rinn (Broad Institute, US), Prof Alistair Forrest (Harry Perkins Institute of Medical Research, Perth), Assoc Prof Aaron Darling (University of Technology Sydney)
- support ABACBS to get established as the professional society for Australian bioinformaticians and computational biologists.

# Student Training and Support



EMBL Australia's student programs give Australian PhD students access to advanced training and networking opportunities in Australia and overseas. 2015–16 saw the first EMBL Australia PhD students enrolled under a pilot program coordinated jointly by EMBL Australia and UNSW Australia.

## PhD studies

### EMBL Australia Partnership PhD Program pilot

Following a challenging selection process, the first group of four PhD students enrolled under the EMBL Australia banner started their PhD studies at UNSW Australia in Semester 1, 2016. They are part of the new EMBL Australia Partnership PhD Program pilot, jointly run by EMBL Australia and UNSW Australia, that aims to attract some of the best international students to Australia.

The successful students are:

**Jorge Luis Galeano Niño:** originally from Colombia, Jorge completed a Medical Doctorate in 2011. Following this, he has worked with Maté Biro for two years, successfully completing a MPhil in Medicine at the Centenary Institute and University of Sydney. Following a short stint in Maté's laboratory at UNSW as a research assistant, Jorge was awarded the EMBL Australia PhD scholarship. He started his PhD at the EMBL Australia node with Maté Biro at UNSW in January 2016.

**Jonathan Franco Berengut:** an Australian graduate with a Science degree from the UNSW, Jonathan received the highest honours mark in history at the School of Biotechnology and Biomolecular Sciences and was subsequently awarded the Garry King prize for best Honours thesis in Molecular Biology or Genetics Major. He has also just been awarded the University Medal and a UNSW Research Excellence Award. Jonathan began his PhD this January 2016 and will be designing and synthesising custom DNA origami nanostructures to study principles of self-assembly in nature supervised by Lawrence Lee.

**Andre Leitao:** completing his Veterinary Doctorate in 2013 at the University of Lisbon, Andre was awarded the prize for best student of the university in 2013. Following this, he did an internship in Holland in an agro-biotechnology company (Friesland Campina) and completed an internship at the Wageningen University on Food Technology. He will start his PhD in March 2016, on the role of synuclein aggregation and the mechanisms of formation of Lewy Bodies.

**Ana Montserrat Martinez:** joining us from Spain, Ana went to the Polytechnic University of Valencia for her Bachelor of Science in Biotechnology, and to the University of Valencia for her Masters degree in Research and Development of drugs. She will join the Node in Single Molecule Science in March to study the interaction of proteins with membranes, working on cell penetrating peptides and pore-forming toxins.

Successful applicants for an EMBL Australia Partnership PhD position are invited to apply to the university for a scholarship to cover a living stipend and, for international students, tuition fees. Supervisors, who are EMBL Australia group leaders or alumni, provide top-up funding plus travel grants and participation fees for EMBL courses and symposia.

After the success in choosing the first group of PhD students, the program will be launched nationally in 2016–17.

## EMBL International PhD Program

Simone Li is completing her PhD at EMBL Heidelberg, Germany, under the EMBL Australia International PhD Program. Her studies were jointly supervised by Dr Peer Bork, EMBL Heidelberg, and Prof Marc Wilkins at the University of New South Wales.

### Simone Li—Gut microbiota and faecal transplants

Simone Li is researching the impact on the gut biota in humans of faecal microbiota transplantation. This is a technique increasingly being used to treat gastrointestinal disorders and *Clostridium difficile* infection. Using metagenomic data, Simone is investigating the fate of introduced microbial strains in the recipient gut.

Simone began her PhD in September 2012 at EMBL Heidelberg with Dr Peer Bork, Senior Scientist and Joint Head of EMBL's Structural and Computational Biology Unit and Strategic Head of Bioinformatics. She is currently writing up her PhD thesis and aiming for submission in August 2016.

Australian students are able to apply directly to EMBL's International PhD program. Monash University student, Morgan Oatley, was successful in 2015 and is now studying for a PhD in the Mouse Biology Unit, EMBL Monterotondo.

## Courses and travel grants for PhD students

### 2015 EMBL Australia PhD Course

The third annual EMBL Australia PhD Course was held at the Harry Perkins Institute of Medical Research in Perth in late June and early July 2015. The course is modelled on the compulsory pre-doctoral training attended by all incoming PhD students at EMBL in Europe.

The two-week long residential program was packed with seminars, workshops and opportunities for networking with students from around the country as well as renowned Australian and international scientists. The program provides students with a broad exposure to the life sciences, fosters the creativity of young scientists and provides a flying start to their careers.

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### ACCOMMODATION, MEALS AND FIELD TRIPS WERE ALL FUNDED FOR THE ATTENDEES BY EMBL AUSTRALIA, BIOPLATFOMS AUSTRALIA AND THE UNIVERSITY OF WESTERN AUSTRALIA.

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Sixty-two first-year and second-year students from around Australia attended the course, which was held at the Harry Perkins Institute of Medical Research in Perth. The course included symposium-style presentations from 75 Australian and international speakers, as well as workshops and poster sessions. Technical sessions spanned gene expression, bioinformatics and imaging (among many other topics), and the course also held a session on science communication.

Highlights included a talk by Prof Ian Frazer, AC, in the translational and clinical sciences session on 'HPV vaccines—theory to practice'. In a free public lecture, the then Chief Scientist of Australia, Prof Ian Chubb, talked on the importance of building momentum on science, technology, engineering and mathematics (STEM) policy.





*EMBL Australia PhD Course class of 2015. Credit: Alicia Murray-Jones*

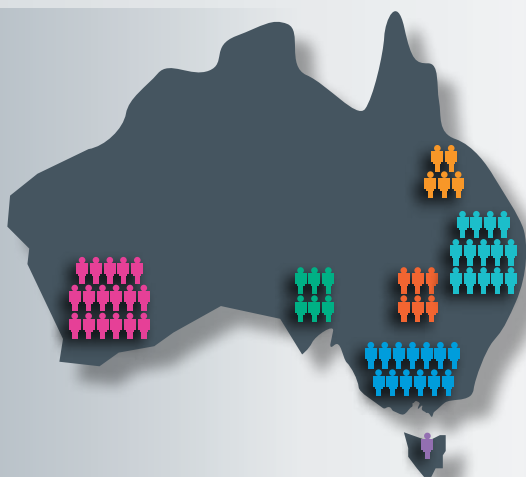


# 3rd EMBL Australia PhD Course

SPEAKERS

75  
SPEAKERS

62  
STUDENTS



## STATE UNIVERSITY/INSTITUTE

- ACT** Australian National University, Australian Institute of Sport
- NSW** Lowy Cancer Research Centre, The University of Sydney, The University of Newcastle, Garvan Institute of Medical Research, UNSW Australia, Macquarie University, Victor Chang Cardiac Research Institute
- QLD** University of the Sunshine Coast, QIMR Berghofer Medical Research Institute, Central Queensland University, James Cook University
- SA** The University of Adelaide, Flinders University, The South Australian Health and Medical Research Institute, University of South Australia
- TAS** Menzies Research Institute Tasmania
- VIC** Walter and Eliza Hall Institute of Medical Research, Monash University, Hudson Institute of Medical Research, Burnet Institute, St Vincent's Institute of Medical Research, Baker IDI, Peter MacCallum Cancer Centre, The University of Melbourne, CSIRO, Murdoch Childrens Research Institute
- WA** Harry Perkins Institute of Medical Research, Lung Institute of Western Australia, Murdoch University, Telethon Kids Institute, The University of Western Australia

## Venue:

Harry Perkins Institute of Medical Research, Perth

## Date:

21 June – 3 July 2015

## Perth organising team:

Dr Archa Fox  
Dr Louise Winteringham  
Dr Joshua Mylne  
Ms Rosie Goldup  
Ms Meredith Eddington

## Topics:

Genomes and gene expression  
Epigenetics and neurobiology  
RNA regulation  
Bioinformatics  
Structural biology  
Mass spectrometry  
Next-generation sequencing  
Organelles to organogenesis  
Cell and developmental biology  
Animal models  
Imaging  
Neuroscience and neurobiology  
Systems biology  
Translational and clinical sciences  
Science communication

## Highlights:

Prof Ian Chubb, AC, Chief Scientist of Australia, 'Building momentum on STEM policy', public lecture  
Prof Ian Frazer, AC, 'HPV vaccines—theory to practice'  
Student poster session  
Brainstorming session: How do we solve the biological question using techniques learnt in the course?

## Plenary speakers:

Dr Cornelius Gross (EMBL Monterotondo, Italy) on neurobiology and RNA regulation  
Dr Donal O'Carroll (EMBL Monterotondo, Italy) on RNA function in germ and stem cell biology

STUDENT DEMOGRAPHICS



## EMBL Australia PhD Symposium

The 2015 EMBL Australian PhD Symposium, *Completing the Pipeline: From Biology to Bioinformatics and Back Again*, was held at Bio21 in Melbourne, 25–27 November 2015. It featured Australian and international speakers, oral and poster presentations from research students and early-career researchers, and informal blackboard/panel sessions with keynote speakers.

Keynote speakers included: Nobel Laureate Prof Peter Doherty, AC, University of Melbourne; Dr Lezanne Ooi, University of Wollongong; Prof Susan Clark, Garvan Institute; Assoc Prof Joanne Lind, University of Western Sydney; Prof Elina Ikonen, University of Helsinki; Dr Geoff Macintyre, University of Cambridge; and EMBL Australia Group Leader Assoc Prof Ville-Petteri Mäkinen, SAHMRI.

The three-day symposium, attended by 163 PhD students from all Australian states and territories except Northern Territory, explored the current revolution in biological sciences, the integration of large-scale biology and computational approaches to answer our biological questions.

This is the second EMBL Australia PhD Symposium, the meeting that is organised by students for students. The format is inspired by the annual symposium organised by first-year PhD candidates at EMBL's Heidelberg campus in Germany. The next PhD Symposium, *Unravelling Nature's Secrets: using science to see beyond*, will be held at SAHMRI in Adelaide in November 2016.

During the conference, students also presented their research to their peers through talks and posters. The best were awarded prizes in three categories.

### Oral presentation awards

First place: Scott Youtlen (Garvan)

Equal second:

Katia Jindrich (UQ)

Nilisha Fernando (ANU)

### Poster Presentation Awards (one per session)

Tahsha Say (UQ)

Amanda Khoury (Garvan)

Hendrika Duivendoorn (Latrobe Uni)

### Honours Poster Awards (one per session)

Suzy Hur (Victor Chang)

Annette Jacobsen (WEHI)

Participants said:

*'I'm heading back to my PhD re-invigorated'*

*'My conference itch has just been satisfied'*

*'Most of the speakers who attended the entire symposium, including the celebration dinner, gave us feedback about how fun and inspiring the symposium was and that they enjoyed the interaction with the students'*

Anton Kalsbeek, co-chair, organising committee

*'The symposium helped provide an opportunity for attendees to engage with other students from various fields of life science, who could become future colleagues, collaborators and even friends! Also, it provided an opportunity to present their PhD research to a wider audience'*

Anton Kalsbeek, co-chair, organising committee



The 2015 EMBL PhD Symposium participants.  
Credit: 2015 EMBL PhD Symposium

# EMBL PhD Symposium Travel Grants

EMBL Australia awarded ten grants under the EMBL PhD Symposium Travel Grants program, which allows students to attend the annual EMBL PhD Symposium that is held at EMBL's headquarters in Heidelberg, Germany.

The 17th EMBL PhD Symposium, held from 22 to 24 October 2015, was titled *Just by chance? Randomness & variability shaping biology* and explored the importance of randomness and variability in biology.

EMBL Australia supported 10 students (out of 16 applications) to attend the symposium.

This symposium is organised annually by EMBL's second-year PhD students. The EMBL PhD Symposium Travel Grants are open to students from almost any field who are currently enrolled in a PhD program at an Australian University and have not yet submitted a thesis.

## Travel grants to the 17th EMBL PhD Symposium

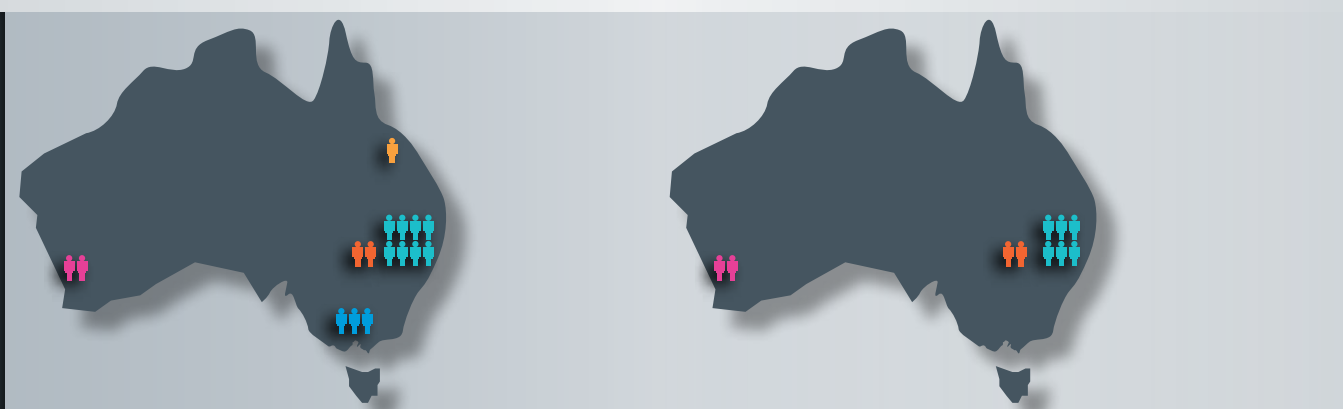
22–24 October 2015

*Just by chance? Randomness & variability shaping biology*, at EMBL Heidelberg, Germany

### NUMBER OF APPLICATIONS

### NUMBER FUNDED

NUMBER OF APPLICATIONS



### STATE UNIVERSITY/INSTITUTE

- ACT** Australian National University
- NSW** Victor Chang Cardiac Research Institute, The Garvan Institute of Medical Research, The University of Sydney, UNSW Australia
- QLD**
- SA**
- TAS**
- VIC**
- WA** Telethon Kids Institute, The University of Western Australia



Rebecca Poulos, UNSW Australia, presented her research in a talk and a poster. Credit: EMBL International PhD Symposium



Meeting other students at the coffee break. Credit: EMBL International PhD Symposium

*'During my trip to EMBL I received a range of valuable feedback on my current project, both from students and academics. This included suggestions of several ideas/analyses that I had overlooked and will be clearly worth pursuing, to the benefit of my project. Having made contact with a number of relevant researchers, I feel I would now be able to contact these people if further queries arise.'*

**Ira Deveson, Garvan Institute of Medical Research**

*'I was able to discuss my research with peers from all over the world, including discussions regarding the CRISPR/Cas9 nuclease with Andrea Smidler, and about chromatin dynamics and low-input NGS library production with Peter Fraser. This was important to my research as I plan to use both CRISPR/Cas9 and low-input methods in future experiments during my PhD.'*

**Tim Stuart, The University of Western Australia**

*'I met a number of researchers who work in the same field as I do. This meant that I could engage in fruitful discussions pertinent to both our research topics and build networks which will undoubtedly benefit my career into the future.'*

**Rebecca Poulos, UNSW Australia**



## Outreach and Communication

EMBL Australia undertakes a range of activities to communicate across the nodes and initiatives and with member organisations.

Activities also reach beyond the organisation to engage with: other scientists, students and science organisations in Australia and internationally (including our partner organisations); government departments and funding organisations; business leaders; science journalists; and the general public.

The key message is the value that EMBL Australia brings to its members and potential future members, as well as to life sciences in Australia generally.

### THE LYNN GROUP HOSTED FOUR YEAR 11 STUDENTS IN THE LAB FOR THE DAY TO LEARN ABOUT IMMUNOLOGY, MICROBIOLOGY AND GENOMICS.

### EMBL Australia Showcase

In April 2015, EMBL Australia showcased its research program and the benefits from its strong connection to EMBL to early-career researchers at The University of Melbourne.

Speakers included EMBL Australia Scientific Head Nadia Rosenthal, EMBL alumnus Michael Parker (now Deputy Director, St Vincent's Institute), five EMBL Australia group leaders from three states and two EMBL–Australia Collaborating Group leaders. The one-day event was hosted by The University of Melbourne's Bio21 Institute and Faculty of Medicine, Dentistry and Health Sciences Biosciences Research Domain.

EMBL Australia will hold a similar showcase in Canberra in July 2016, which will be hosted by Prof Simon Foote, director of The John Curtin School of Medical Research. EMBL Director Prof Matthias Hentze will speak at the event.



Nadia Rosenthal presenting at the Showcase. Credit: EMBL Australia





## Newsletters

EMBL Australia sends a well-received monthly email newsletter to stakeholders, with information on EMBL Australia activities and other useful life sciences information. Until December 2015, these were sent from Scientific Head Nadia Rosenthal. Subsequent newsletters came from Brandon Wainwright, EMBL Australia Chair, and the EMBL Australia Secretariat.

Old and inactive addresses were cleared out from the newsletter subscriber database in June 2015.

### Newsletter recipients

## JANUARY 2016

1314

## JANUARY 2015

1434

## JANUARY 2014

1248

## JANUARY 2013

972

EACH MONTH, EMBL AUSTRALIA IS MENTIONED ACROSS A RANGE OF SOCIAL AND ONLINE MEDIA, INCLUDING TWITTER, WORDPRESS, GOOGLE+, TUMBLR AND VARIOUS NEWS SOURCES.

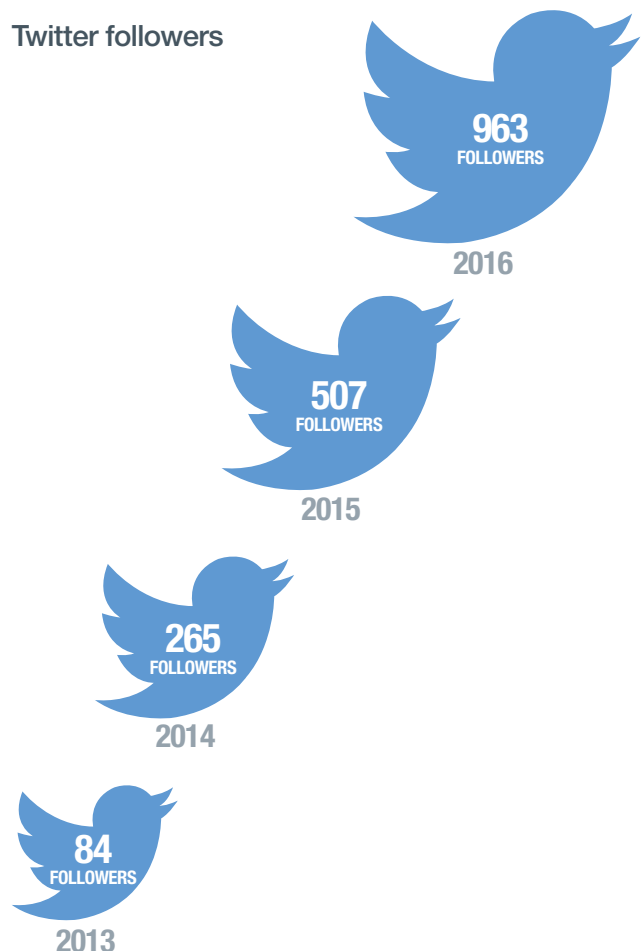
## Twitter @EMBLAustralia

EMBL Australia tweeted throughout the year: promoting research achievements, the newsletters, events and the new EMBL Australia website; highlighting opportunities such as jobs, scholarships and training; and interacting with twitter users in other organisations.

The EMBL Australia PhD Course in June–July 2015 generated lots of activity on the EMBL Australia Twitter handle.

@EMBLAUSTRALIA GAINED AN AVERAGE OF 38 TWITTER FOLLOWERS EACH MONTH.

### Twitter followers





## EMBL Australia website

The EMBL Australia website was updated in February 2016 with a fresh and appealing look and a layout that is easy to navigate. Website visitors have risen in response to promotion on social media, such as sharing research information and announcing the release of each newsletter.

## Media

EMBL Australia research featured in the news and popular press several times during the year.

Victorian node Head and ARMI Deputy Director Prof Peter Currie and PhD student Phong Nguyen, from the Faculty of Medicine, Nursing and Health Sciences, together with Dr Georgina Hollway from the Garvan Institute of Medical Research won the 2015 Eureka Prize for scientific research.



Phong Nguyen, Dr Georgina Hollway and Prof Peter Currie receive their award at the Australian Museum Eureka Prizes 2015. Credit: Brendon Thorne/Getty Images

Phong Nguyen was also profiled in Cosmos magazine.

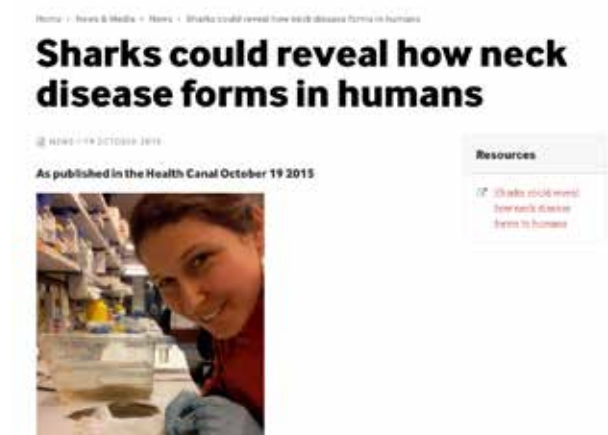


<https://cosmosmagazine.com/life-sciences/science-portraits-biologists>

Caroline Boisvert from the Currie lab was featured on the Health Canal website as well as in ARMI's newsletter.



[www.healthcanal.com/medical-breakthroughs/67923-sharks-could-reveal-how-neck-disease-forms-in-humans.html](http://www.healthcanal.com/medical-breakthroughs/67923-sharks-could-reveal-how-neck-disease-forms-in-humans.html)



[www.armi.org.au/news-media/news/sharks-could-reveal-how-neck-disease-forms-humans](http://www.armi.org.au/news-media/news/sharks-could-reveal-how-neck-disease-forms-humans)



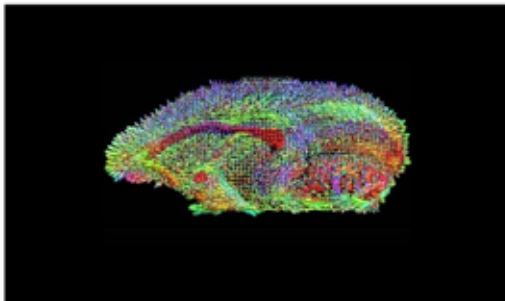
**James Bourne's** research on a new visual pathway in the brain was the subject of an article in *Asian Scientist* *AsianScientist* (Feb. 25, 2015) – *Scientists have discovered a new visual pathway in the brain that could potentially adapt to injury or trauma and ultimately prevent blindness. The study, published in Current Biology, sheds new light on the relationship between vision loss and brain plasticity—the extraordinary ability of the brain to modify its own structure and function as a result of change or damage.*



### An Alternative Path To Restore Sight

The visual processing system is more adaptable than previously thought, and an MRI study may have identified the region of the brain responsible.

[Asian Scientist Newscroom](#) | February 25, 2015 | [In the Lab](#)



<http://www.asianscientist.com/2015/02/in-the-lab/alternative-path-restore-sight/>

**Thomas Preiss** was a co-author on research featured in the Sydney Morning Herald.

### A breast milk protein that sustains life could also prevent death

March 3, 2015

[Read later](#)



**Bridie Smith**

Science Editor, The Age

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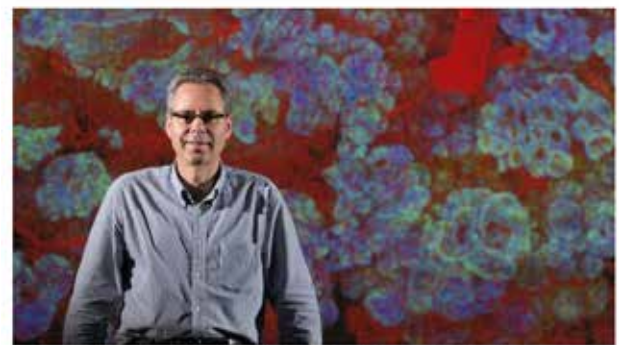
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Professor Geoff Lindeman, a researcher from the Walter and Eliza Hall Institute. Photo: Jason South

A protein that has a key role to play in the body's immune system has now been found to be critical for sustaining milk production in the breast, a function essential for the survival of mammalian species.

Published on Tuesday in the journal *Nature Cell Biology*, the findings raise the prospect of the protein becoming an important target for medical researchers working on new anti-cancer drugs.

"Our work has highlighted [the protein's] very direct importance in breast development and therefore possibly breast cancer," said [Walter and Eliza Hall Institute](#) researcher Geoff Lindeman. "That was a bit of a surprise."

Working with colleagues Nai Yang Fu and Jane Visvader, Professor Lindeman found the protein known as MCL-1 was crucial for keeping milk-producing luminal cells alive during lactation.

<http://www.smh.com.au/technology/sci-tech/a-breast-milk-protein-that-sustains-life-could-also-prevent-death-20150302-13sj3a.html>

**David Lynn's** research on the microbiome and its links to disease was profiled in the Adelaide Advertiser: 'Key to chronic disease later in life'.

David also provided a quote to the Daily Telegraph on why allowing kids to play in the mud might be good for them.

**Anastasia Sribnaia**, a technician in the Lynn lab, was on The Totally Wild TV show and Mix102.3 radio, where she swabbed the studios and then discussed what was cultured in the lab.



Screenshot from Totally Wild TV show featuring Anastasia Sribnaia (Season 23 Episode 49)

[tenplay.com.au/channel-eleven/totally-wild/season-23/episode-49](http://tenplay.com.au/channel-eleven/totally-wild/season-23/episode-49)

Anastasia with the Mix 1023 team, Jodie and Soda. Credit: Mix102.3

## JUST HOW CLEAN ARE THE MIX102.3



Posted by Rodney Magazinovic  
01/01/0001



Just how clean are the Mix102.3 studios?

Jodie thinks they are not very clean at all and most of it is Soda's fault!

We had Laboratory Technician Anastasia from the South Australian Health and Medical Research Institute (SAHMRI) in to take some swabs and find out:

[www.mix1023.com.au/shows/jodie-soda/just-how-clean-are-the-mix1023-studios](http://www.mix1023.com.au/shows/jodie-soda/just-how-clean-are-the-mix1023-studios)

# Professional Activities



## Publications

The number of publications increased substantially in 2015, reflecting EMBL Australia's growth and the maturation of the group leaders' research. The 57 publications in 2015 comprised 53 journal articles and four book chapters. The full publication list is in Appendix 1.

Year	Publications
2015	57
2014	26
2013	30
2012	6

## Active grants

Twelve new grants to EMBL Australia scientists commenced in 2015: three from the NHMRC, three from the ARC and others from The Pratt Foundation, the Muscular Dystrophy Association (USA) and the Sylvia & Charles Viertel Charity Foundation.

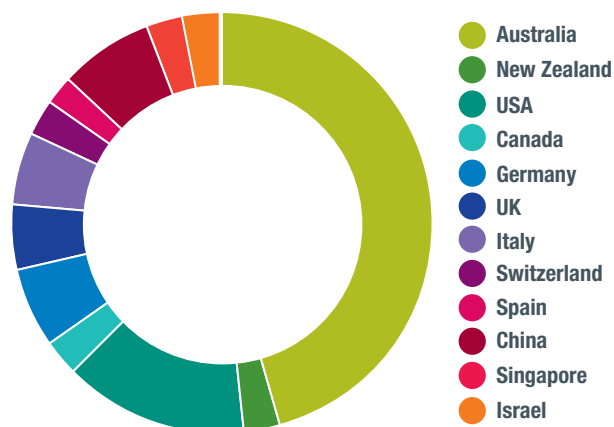
Another 34 ongoing grants supported our research. These came from the NHMRC (18), ARC (7), European research funding organisations (5) and other Australian organisations (4).

A full list of grants is in Appendix 2.

## Invited presentations

EMBL Australia scientists gave 41 invited conference and seminar presentations, 21 of which were international.

### Invited presentations



- Nadia Rosenthal gave the 10th Randall Lecture at King's College London, UK
- David Lynn received OECD sponsorship to present at the International Symposium on Animal Functional Genomics in Piacenza, Italy
- Edwina McGlinn spoke at EMBL Monterotondo, Italy
- Kat Gaus gave three presentations at different events in Germany
- James Bourne gave talks at Rochester University, New York, and the National Institute of Mental Health, Maryland, USA
- Thomas Preiss spoke at six different conferences and meetings in Australia

## Professional societies

EMBL Australia scientists are members of 16 international and 11 Australasian scientific societies, ranging from immunology to biophysics, and developmental biology to neuroscience. The societies with the greatest number of EMBL Australia members are:

- Australia and New Zealand Society for Cell and Developmental Biology—Peter Currie, Kat Gaus, Edwina McGlinn, Nadia Rosenthal
- Australian Society for Medical Research—James Bourne, Kat Gaus, Ville-Petteri Mäkinen.

The full list is in Appendix 3.

## Journal editorial roles

EMBL Australia scientists, including Nadia Rosenthal, Peter Currie, Kat Gaus, Ville-Petteri Mäkinen, Thomas Preiss and James Bourne, have editorial roles on ten international journals. The full list is in Appendix 4.

**IN MAY 2015, NADIA ROSENTHAL WAS APPOINTED THE EDITOR-IN-CHIEF OF A NEW OPEN-ACCESS JOURNAL THAT WILL EXPLORE THE POTENTIAL OF ORGANISMS TO RESTORE AND REGENERATE DAMAGED CELLS, TISSUES AND ORGANS. NPJ REGENERATIVE MEDICINE IS A COLLABORATION BETWEEN NATURE PUBLISHING GROUP AND MONASH UNIVERSITY. PETER CURRIE WAS APPOINTED AN ASSOCIATE EDITOR.**

## Conference organising committees

Edwina McGlenn was on the local organising committee for ComBio2015, 27 September to 1 October 2015, Melbourne.

Peter Currie is on the international organising committee for the 2016 Congress of Vertebrate Morphology, 29 June to 3 July, Washington, DC, USA.

Max Cryle is on the local organisation committee for 21st International Conference on Cytochrome P450, 2019, Brisbane

## Additional academic contributions

EMBL Australia scientists demonstrated their scientific leadership with many other academic contributions, both in Australia and internationally, including:

- providing scientific advice on boards and committees for organisations such as The Jackson Laboratory, Euro BioImaging and the Steering Committee on Zebrafish Research
- reviewing grants and fellowships, including for the NHMRC, UK Medical Research Council and the European Research Council
- assessing possible scientific misconduct in Finland.

A list of activities is given in Appendix 5.



# Staff and Students



## Research staff and students

### Rosenthal Group

Prof Nadia Rosenthal, Group Leader and Scientific Head

Dr Mauro da Costa, Research Fellow: The role of cardiac transcription factors in homeostasis and disease

Dr Milena Furtado, Research Fellow: Role of fibroblast cardiogenic genes in heart disease and programming

Dr James Godwin, Research Fellow: The immunological control of scar-free wound healing and regeneration

Dr Alex Pinto, Research Fellow: Biology of macrophages in the injured and uninjured mammalian heart

Dr Ekaterina Salimova, Research Fellow: Dissecting roles of pro-regenerative factors IGF-1 and relaxin in promoting cardiac repair and regeneration

Dr Lina Wang, Research Fellow: Differentiation of cardiomyocytes and macrophages from embryonic stem cells

Ms Anjana Chandran, Research Assistant (until Dec 2015)

Mr Alexei Ilinykh, PhD Student: The role of cardiac tissue macrophages in the ageing heart

Mr Ryan Debuque, PhD Student: Mechanisms of salamander regeneration

### Currie Group

Prof Peter Currie, Group Leader and Victorian Node Head

Dr Joachim Berger, Research Fellow: Modelling myopathies in zebrafish

Dr Catherine Boisvert, Research Fellow: Skeletal evolution in early gnathostomes

Dr Patricia Jusuf, Research Fellow: Specification of nerve cell subtypes in the developing central nervous system

Dr Wouter Masselink, Adjunct Research Fellow (from Aug 2015): Cellular interplay of pectoral fin myogenic progenitor cells

Dr Ivana Mirkovic, Research Fellow (until Dec 2015): Role of scube gene family during vertebrate muscle development

Dr Phong Nguyen, Research Fellow: Origins and genetic control of progenitor and stem cells from zebrafish

Dr Mei Li, Research Fellow (from Sep 2015): Characterisation and therapeutic screening on zebrafish muscular dystrophy model

Dr Lee Miles, Research Fellow (until Dec 2015)

Ms Silke Berger, Research Assistant

Ms Fruszina Fenyes, Research Assistant

Ms Lucy Hersey, Research Assistant (from Jan 2016)

Ms Carmen Sonntag, Research Assistant

Ms Ophelia Erhlich, PhD Student: Nanomedicine based therapies for extracellular matrix diseases

Mr Zhenhua Li, PhD Student: Investigating muscle regeneration in zebrafish muscular dystrophy mutants

Mr Jeremy Ng, PhD Student: Role of intrinsic versus extrinsic cues in cell type determination during development and regeneration (co-supervisor Patricia Yap)

Mr Hakan Tarakci, PhD Student: Dissecting the role of sarcomere assembly in the pathology of human congenital myopathy (co-supervisor Joachim Berger).

Ms Danni Ratnayake, PhD Student: Generation of the muscle stem cell compartment for regeneration and its utilisation during repair (co-supervisor Alasdair Wood)

Veronica Joshi, Honours Student: Determining the mechanism of Col4a2 related muscular dystrophy (co-supervisor Alasdair Wood)

Duy Tran, Honours Student: Examination of ASPH function in zebrafish embryonic development (co-supervisor Ivana Mirkovic)

Naomi Cohen, UROP Student (until Dec 2015): Analysis of somitic contribution to the zebrafish AER (co-supervisor Wouter Masselink)

### McGlinn Group

Dr Edwina McGlinn, Group Leader

Dr Heidi Bildsoe, Research Fellow (from Apr 2015): miR-196, Hox genes and axial patterning: making a spine from top to bottom

Dr Olivier Serralbo, Research Fellow (until Nov 2015): Hox genes in spinocerebellar circuitry

Ms Lisa Wong, Research Assistant

Mr Eamon Coughlin, PhD Student: miR-196 in the development of the CNS

### Cryle Group

Dr Max Cryle, Group Leader (from Jan 2016)

Dr Jennifer Payne, Research Fellow (from Feb 2016)

Mr Kieran Watkins, Honours Student

Mr Hengkang Yan, Honours Student



## Davidovich Group

Chen Davidovich, Group Leader (from Sep 2015)

## Plachta Group

Dr Nicolas Plachta, Group Leader (until Sep 2015)

Dr Stephanie Bissiere, Research Fellow (until Sep 2015):  
Imaging the mechanical forces patterning mouse embryos

Dr Melanie White, Research Fellow: Imaging the early  
events patterning in mammalian embryos

Dr Jennifer Zenker, Research Fellow (until Oct 2015):  
Revealing the mechanisms controlling transcription factor  
dynamics in single cells

Mr Juan Silva, Research Assistant (until Sep 2015)

## Heisler Group

Dr Marcus Heisler, Group Leader

Dr Paz Merelo, Research Fellow: Downstream targets of  
Class II and Class III HD-ZIP transcription factors

Dr Hathi Ram, Research Fellow: Genomic approaches to  
dorsiventral patterning

Dr Tufail Bashir, Research Fellow: Control of organ  
orientation in the Arabidopsis flower (until Dec 2015)

Dr Sudeep Sahadevon, Research Fellow: A bioinformatics-  
based approach to understanding dorsiventral transcription  
factor regulation of auxin-triggered morphogenesis (until  
Dec 2015)

Ms Paola Ruiz Duarte, Technician (until Dec 2015)

Ms Carolyn Ohno, Technician

Ms Neha Bhatia, PhD Student: Mosaic approaches to  
understand the coordination of plant cell polarity

Ms Xiulian Yu, PhD Student: Dorsiventral boundaries and  
morphogenesis

## Mäkinen Group

Dr Ville-Petteri Mäkinen, Group Leader

Dr Aaron Casey, Research Fellow: Methods to prevent  
metabolic syndrome using mouse models of the human  
disease

Dr Song Gao, Research Fellow: A multivariate statistical  
framework for connecting omics data with clinical end-  
points

Dr Stefan Mutter, Research Fellow: Dynamic metabolic  
responses to successive high-fat meals in patients with  
type 1 diabetes and non-diabetic controls

Ms Anindita Goswami, MSc Student (University of Adelaide)

Ms Carrie Worden, Undergraduate Student (University of  
South Australia)

Ms Kara Paxton, Undergraduate Student (University of  
South Australia)

## Lynn Group

Assoc Prof David Lynn, Group Leader

Dr Kenneth Bryan, Senior Research Fellow: Protein  
interaction machines in oncogenic EGFR signalling

Dr Miriam Lynn, Senior Research Fellow: The impact of  
the microbiome on specific and non-specific vaccine  
responses

Dr Damon Tumes, Senior Research Fellow: Epigenetic  
regulation of innate and adaptive immunity

Mr Manuel Bernal-Llinares, Senior Software Developer

Ms Anastasia Sribnaia, Laboratory Technician

Ms Theodosia Charitou, PhD Student/Research Assistant:  
Information flow analysis of the EGFR network

Dr Damien Drew, Flinders Advanced Placement Medical  
Student 2015: Transcriptional reprogramming of immune  
networks in preterm babies receiving DHA supplementation

Dr Ben Tucker, Flinders Advanced Placement Medical  
Student 2016: Vaccine-induced training of innate immunity

Dr Lisa Schmidt, Honours Student (Flinders University):  
Transforming malignant graphs into benign ones

Mr Ivan Goenawan, Honours Student (Flinders University):  
Visualisation and analysis of protein-protein interaction  
networks

Ms Laura Sourdin, Honours Student (University of South  
Australia): Vaccine-induced training of innate immunity



## EMBL–Australia Collaborating Groups

### Bourne Group

Assoc Prof James Bourne, EMBL–Australia Collaborating Group Leader

Dr Inaki Carril, Research Fellow: A role for pulvinar nucleus in cortical development and plasticity

Dr Jihane Homman-Ludiye, Research Fellow: Elucidating the genetic programs underpinning cortical and thalamic development

Dr Lievan Huang, Research Fellow (from April 2015)

Ms Claire Warner, PhD student/Research Fellow: Fear networks in the nonhuman primate

Mr William Kwan, Research Assistant

Mr Mitchell deSouza, Research Assistant

Mr Leon Teo, PhD Student: Novel conjugated biomaterials in the treatment of neurotrauma and neurodegeneration

Mr Anthony Boghdadi, PhD student: The Nogo Receptor and its ligands are responsible for repair inhibition following cortical ischemia

Mr Dylan Fox, Honours Student: The marmoset as a model of behavioural plasticity: Novel training methods to gauge their attention

Ms Anoushka Lal, UROP Student: Embryonic Development of the Nonhuman Primate Visual System

Prof Anita Hendrickson, Adjunct Professor

Dr Tobias Merson, Affiliate Research Fellow

### Preiss Group

Prof Thomas Preiss, EMBL–Australia Collaborating Group Leader

## Initiatives

### Bioinformatics Resource

Assoc Prof Andrew Lonie, Director, VLSCI/University of Melbourne (from Jul 2015)

Dr Seán O'Donoghue, Acting Director, QCIF/UQ

Dr Lien Le, Lead Data Integration, QCIF/UQ

Mr Danny Sheehan, BRAEMBL tool management, QCIF/UQ

Mr Gavin Graham, Lead IT, QCIF/UQ (until Jun 2015)

Prof Mark Ragan, Senior Scientist, QCIF/UQ

Ms Anne Kunert, Bioinformatician, QCIF/UQ (from Jan 2016)

Mr Derek Benson, Genomics Virtual Lab developer, VLSCI/University of Melbourne

Ms Madison Flannery, Flagships, VLSCI/University of Melbourne (from Jan 2016)

Mr Simon Gladman, Genomics Virtual Lab developer, VLSCI/University of Melbourne

Mr Nuwan Goonasekera, Genomics Virtual Lab developer, VLSCI/University of Melbourne

Mr Yousef Kowsar, Genomics Virtual Lab developer, VLSCI/University of Melbourne

Dr Igor Makunin, Genomics Virtual Lab developer, VLSCI/University of Melbourne

### SBI Australia

Dr Sarah Boyd, Developer, Systems Biology Platform (until Jun 2015)

Prof Hiroaki Kitano, Sir Louis Matheson Distinguished Visiting Professor

Dr Hieu Tri Nim, Research Fellow

Dr Saskia Reibe-Pal, Project Officer and Affiliate Research Fellow (until Sep 2015)

Dr Samik Ghosh, Adjunct Research Fellow

Dr Yukiko Matsuoka, Adjunct Research Fellow

Dr Madeleine Van Oppen, Adjunct Professor

## EMBL Australia Secretariat

Prof Nadia Rosenthal, Scientific Head

Mr Silvio Tiziani, Executive Director

Prof Peter Currie, Victorian Node Head

Ms Laura Crilley, Executive Officer

Ms Jane McCausland, Student Program Coordinator

Ms Penny Rowlett, Finance Officer

## Research Partners

EMBL Australia signed agreements with a variety of research organisations to support Australian life sciences research through joint activities including collaboration and sharing of resources and expertise via workshops, training and other opportunities.

### **Australian Genome Research Facility (AGRF)**

AGRF is Australia's largest provider of genomics services and solutions with a national network of state-of-the-art facilities, technology and expertise.

### **Australian Nuclear Science and Technology Organisation (ANSTO)**

ANSTO is Australia's national nuclear research and development organisation.

### **Australian Phenomics Facility (APF), Australian National University**

Discussions are progressing regarding arrangements for EMBL Australia to become a member of the International Mouse Phenotyping Consortium (IMPC). The IMPC is dedicated to making available a collection of mouse strains in which the function of every gene in the genome is known.

### **BioGrid Australia**

BioGrid Australia is a secure research platform and infrastructure providing access to real-time clinical, imaging and bio specimen data.

SBI Australia and BioGrid Australia are exploring ways for BioGrid expertise and infrastructure to support collaborative activities.

### **Systems Biology Institute (Japan)**

SBI has established its first international node, SBI Australia, in collaboration with EMBL Australia.

# Governance



2015–16 was a year of change in governance for EMBL Australia. With the renewal of Australia's associate membership of the European Molecular Biology Laboratory and the resignation of Scientific Head, Nadia Rosenthal, Council took the opportunity to review EMBL Australia's governance arrangements and its overall operation.

A new Council constitution was discussed and endorsed at the July meeting of Council. The new Council, comprising representatives from the Association of Australian Medical Research Institutes, CSIRO, EMBL, Universities Australia and Bioplatforms Australia, met for the first time in December 2015.

Brandon Wainwright was elected Council Chair at the December Council meeting.

## EMBL Australia participants to December 2015

Until December 2015, EMBL Australia was an unincorporated joint venture between the Group of Eight universities and CSIRO, with the support of the Department of Education and the Department of Industry. The Group of Eight universities are:

Australian National University  
Monash University  
University of Adelaide  
University of Melbourne  
University of New South Wales  
University of Queensland  
University of Sydney  
University of Western Australia.

## Council membership to December 2015

Prof Richard Larkins, AO (Chair)

### Australian National University

Prof Chris Goodnow  
Head, Department of Immunology

Prof Kieran Kirk  
Dean, College of Medicine, Biology & Environment, ANU  
College of Medicine, Biology and Environment and ANU  
College of Physical & Mathematical Sciences

### CSIRO

Dr Seán O'Donoghue  
OCE Science Leader, Mathematics, Informatics and Statistics, CSIRO, and Garvan Institute for Medical Research

### EMBL

Prof Iain Mattaj  
Director General, Germany

Dr Silke Schumacher  
Director, International Relations, German

### EMBL Australia

Prof Nadia Rosenthal  
Scientific Head

Mr Silvio Tiziani  
Executive Director

### Monash University

Prof Edwina Cornish  
Provost and Senior Vice-President

Prof Ross Coppel  
Deputy Dean and Director of Research, Faculty of Medicine, Nursing and Health Sciences

### The University of Adelaide

Prof Mike Brooks  
Deputy Vice-Chancellor and Vice-President (Research)

Assoc Prof Paul Thomas  
School of Molecular and Biomedical Sciences

### The University of Melbourne

Prof Paul Gleeson  
Head, Department of Biochemistry and Molecular Biology

### The University of New South Wales

Prof Merlin Crossley  
Dean, Science

Prof Peter Gunning  
Deputy Dean, School of Medical Sciences

### **The University of Queensland**

Prof Brandon Wainwright  
Director, Institute for Molecular Bioscience

Prof Robyn Ward  
Deputy Vice-Chancellor (Research)

### **The University of Sydney**

Prof Trevor Hambley  
Dean, Science

Prof Jill Trehwella  
Deputy Vice-Chancellor (Research)

### **The University of Western Australia**

Prof Peter Leedman  
Head, Laboratory for Cancer Medicine; Deputy Director,  
West Australian Institute for Medical Research; Director,  
Research at Royal Perth Hospital

Prof Robyn Owens  
Deputy Vice-Chancellor (Research)

### **Independent members**

Prof David Day  
Deputy Vice-Chancellor and Vice-President (Research),  
Flinders University

Prof Simon Foote  
Director, John Curtin School of Medical Research, ANU  
College of Medicine, Biology & Environment

Prof Steve Wesselingh  
Executive Director, South Australian Health and Medical  
Research Institute

Prof Doug Hilton  
Director, Walter and Eliza Hall Institute of Medical Research

## **EMBL Australia participants from December 2015**

From December 2015, EMBL Australia is an unincorporated joint venture between the CSIRO, Bioplatforms Australia, the Association of Australian Medical Research Institutes (AAMRI) and Universities Australia (UA).

### **Council membership from December 2015**

#### **Association of Australian Medical Research Institutes**

Prof Andrew Sinclair  
Deputy Director, Murdoch Children's Research Institute

Prof Frank Gannon  
Director, QIMR Berghofer Medical Research Institute

#### **CSIRO**

Dr Paul Savage  
Research Director (Manufacturing) and Program Director,  
Biomedical Manufacturing, CSIRO

Dr David Hansen  
CEO, Australian e-Health Research Centre, Health &  
Biosecurity, CSIRO

#### **European Molecular Biology Laboratory**

Dr Iain Mattaj  
Director General, EMBL, Germany

Dr Silke Schumacher  
Director International Relations, EMBL, Germany

#### **Universities Australia**

Prof Rob Saint  
Deputy Vice-Chancellor (Research), Flinders University

Prof John Carroll  
Head, Biomedical Sciences, Dean, Faculty of Biomedical  
and Psychological Sciences, Monash University

Prof Brandon Wainwright (Chair from December 2015)  
Director, Institute for Molecular Bioscience, University of  
Queensland

Prof Sarah Russell  
Group Leader, Cell Biology Laboratory, Centre for  
Microphotonics, Swinburne University



## Bioplatforms Australia

Andrew Gilbert  
General Manager, Bioplatforms Australia

## Meetings

14 July 2015 (University of Western Australia)  
8 December 2015 (Bio21, University of Melbourne)

## Executive Committee of Council (until December 2015)

Prof Richard Larkins, AO (Chair)

Prof Trevor Hambley  
Dean, Science, University of Sydney

Prof David Day  
Deputy Vice-Chancellor and Vice-President (Research),  
Flinders University

Prof Nadia Rosenthal  
Scientific Head, EMBL Australia

Mr Silvio Tiziani  
Executive Director, EMBL Australia

Dr Silke Schumacher  
Director, International Relations, EMBL, Germany

Prof Edwina Cornish  
Provost and Senior Vice-President, Monash University

Prof Brandon Wainwright  
Director, Institute for Molecular Bioscience, University of  
Queensland

## Meetings (teleconference)

14 April 2015  
27 May 2015  
11 August 2015  
25 August 2015  
20 October 2015  
1 December 2015

## Leadership Team Committee

### Mr Silvio Tiziani (Chair)

#### Executive Director

Silvio is a member of the Australian Institute of Company Directors and the Australian Institute of Management. He has extensive experience in financial analysis and budget management, business development, strategic planning, leadership and corporate governance.

### Dr Sarah Boyd

#### Developer, Systems Biology Research Platform, ARMI, Monash University

Sarah has a background in computer science, biochemistry and molecular biology and has undertaken a variety of research projects at the interface of computer science, mathematics and the life sciences. She has worked in a variety of departments and faculties at Monash and La Trobe Universities, and has been a visiting researcher at US and Australian research institutions.

### Prof Peter Currie

#### Victorian Node Head

Peter is a developmental geneticist, using the powerful zebrafish model to look at the development and regeneration of skeletal muscle in the context of diseases like muscular dystrophy. He is the Deputy Director of ARMI and was appointed Head of EMBL Australia's Victorian node in September 2012. Before he came to ARMI, Peter worked at the Medical Research Council's Human Genetics Unit in Edinburgh.

### Ms Jane McCausland

#### Student Programs

Jane has been in the role of Student Coordinator since 2011. She brings to the role extensive experience in the tertiary sector with experience in the research environment as well University administration.



**Dr Seán O'Donoghue****Bioinformatics Resource Australia**

Seán is an Office of the Chief Executive Science Leader in CSIRO, Sydney. He is also Group Leader and Senior Faculty Member at the Garvan Institute of Medical Research. He received his B.Sc. (Hons) and PhD in biophysics from the University of Sydney, Australia. Much of his career was spent in Heidelberg, Germany, where he worked in the Structural and Computational Biology programme at EMBL, and at Lion Bioscience AG—then the world's largest bioinformatics company—where he was Director of Scientific Visualization. From 2012–15 he was also CSIRO's representative on the EMBL Australia council, and chaired the EMBL Australia Bioinformatics Advisory Committee.

**Prof Nadia Rosenthal****Scientific Head**

Nadia has exceptional scientific credentials, including 16 years working at Harvard Medical School. And 11 years as Head of the EMBL Outstation in Monterotondo, Italy. She is the Scientific Director of ARMI at Monash University and also holds a Chair in Cardiovascular Science at Imperial College London.

**Prof Steve Wesselingh****SA Node Head**

Steve is SAHMRI's inaugural Executive Director. For the last four years he has been Dean of the Faculty of Medicine, Nursing and Health Sciences at Monash University, one of Australia's leading health faculties. Prior to taking up the Deanship, he was Director of the Burnet Institute, an independent medical research institute that specialises in infectious diseases, immunology and public health.

**Scientia Prof Katharina Gaus****NSW Node Head**

Katharina is an NHMRC Senior Research Fellow at the University of New South Wales and Head of the EMBL Australia Node in Single Molecule Science. She received her PhD from the University of Cambridge in 1999 and has led an independent research group since 2005. Her group investigates signal transduction processes with advanced fluorescence microscopy approaches. She was awarded the Young Investigator Award from the Australia and New Zealand Society for Cell and Developmental Biology (2010), the Gottschalk Medal from the Australian Academy of Science (2012) and the New South Wales Science and Engineering Award for Excellence in Biological Sciences (2013).

**Ms Laura Crilley****Executive Officer**

Laura Crilley joined the Australian Regenerative Medicine Institute in 2007, bringing with her experience in both the medical and academic research worlds. From 2007 to 2013 Laura worked as the Executive Assistant to the Director, Prof Nadia Rosenthal, before moving to EMBL Australia as Executive Officer.

**Observers**

Michelle Gallagher and Violeta Traicevski (from June 2015)  
The Social Science

**Meetings**

18 March 2015

13 May 2015

10 June 2015

8 July 2015

12 August 2015

14 October 2015



## Bioinformatics Advisory Committee

Dr Seán O'Donoghue (Chair)  
OCE Science Leader, Mathematics, Informatics and  
Statistics, CSIRO, and Garvan Institute for Medical  
Research

Prof Dave Adelson  
University of Adelaide

Dr Vivien Bonazzi  
National Human Genome Research Institute, USA

Prof Paul Bonnington  
Monash University

Dr Alvis Brazma  
EMBL–EBI, UK

Assoc Prof Andrew Lonie (from Oct 2015)  
The University of Melbourne

Prof Grant Morahan (until Jul 2015)  
The University of Western Australia

Prof Mark Ragan  
The University of Queensland

Dr Stuart Ralph  
The University of Melbourne

Prof Nadia Rosenthal  
Monash University/EMBL Australia

Prof Terry Speed  
WEHI

Mr Silvio Tiziani  
Monash University/EMBL Australia

Prof Marc Wilkins  
UNSW Australia

Dr Jean Yee Hwa Yang  
The University of Sydney

## Observers

Mr Andrew Gilbert, Bioplatforms Australia

## Meetings

7 July 2015, The University of Queensland

9 October 2015, The University of Sydney

# Funding and Stakeholders

## Financial report

### Statement of Income and Expenditure From 1 January 2015 to 31 December 2015

	Secretariat	Research	Student Program	SBI Aust	Bioinformatics	Total	
<b>Income</b>							
Internal Support (Monash/ARMI Contribution)	\$745,199	\$1,074,000				\$1,819,199	1
Donations						\$-	
Other	\$9,490			\$413		\$9,904	
Commercial (Conference sponsorships, fees)		\$(3,676)	\$51,575			\$47,899	2
Interest earned on invested income	\$32,532					\$32,532	3
<b>Total Income</b>						<b>\$1,909,534</b>	
<b>Expenditure</b>							
Salaries Expenditure	\$204,734	\$387,787	\$6,701	\$(219)		\$599,002	
Staff Training and Related	\$1,380	\$6,411		\$(5,827)		\$1,964	
Staff Recruitment & Advertising	\$55,998					\$55,998	4
Sponsorships (Grants/Donations)					\$100,144	\$100,144	5
Lab & Operating Expenses	\$(1,387)	\$86,986				\$85,599	
Travel & Related Expenses	\$88,911	\$55,447	\$86,947	\$10,536	\$2,561	\$244,401	
Student Prizes/Awards/Stipends		\$8,719	\$50,341			\$59,059	
Communications Consultancy	\$86,621			\$(5,488)		\$81,134	6
Other Expenses	\$(963)	\$1,991	\$19,099	\$75	\$48	\$20,250	
Printing & Stationery	\$11,949	\$98	\$4,507	\$315		\$16,868	
Book and Library		\$3,773		\$60		\$3,833	
Vehicle Expenses	\$8,334					\$8,334	
IT, Equipment and Related	\$455	\$7,021	\$6,615	\$(139)		\$13,950	
Telecommunications & Freight	\$(273)	\$5,927	\$195		\$267	\$6,115	
Building Expenses	\$2,037	\$63,339		\$(1,033)		\$64,342	
Finance & Admin	\$(13)	\$413	\$1,641			\$2,041	
Audit Fees	\$1,500					\$1,500	
Central and Faculty Charges	\$722,799					\$722,799	1
<b>Total Expenditure</b>						<b>\$2,087,335</b>	
<b>Net Balance for the year</b>						<b>\$(177,801)</b>	
<b>Balance as at 1 January 2015</b>						<b>\$1,037,431</b>	
<b>Balance as at 31 December 2015</b>						<b>\$859,630</b>	

#### Notes

1. Monash and Australian Regenerative Medicine Institute contribution to Monash central support and overhead charges
2. Income generated to support the EMBL Australia PhD Symposium, Nov 2015
3. This represents interest earned by Monash on the principle Commonwealth Funding Agreement 2009
4. Partner Laboratory Group Leaders recruitment costs
5. Australian Bioinformatics Network Collaboration sponsorship agreement with CSIRO
6. Communication consultants, Science In Public



## Auditor's report



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### INDEPENDENT AUDIT REPORT EMBL AUSTRALIA PARTNER LABORATORY NETWORK

This audit opinion is prepared for the purpose of the Grant Agreement dated 11th December 2009 for the EMBL Australia Partner Laboratory Network ("the Project") between the Commonwealth of Australia as represented by the Department of Innovation, Industry, Science and Research and Monash University.

#### Scope

We have conducted an independent audit in accordance with Australian Auditing Standards of the attached Statement of Income and Expenditure ("the Statement") for the period 1 January 2015 to 31 December 2015. The Statement specifies an amount of \$2,087,335 of expenditure and an amount of \$1,909,534 of contributions towards the EMBL Project comprising of the following programs; the Secretariat, Research, SBI Aust, Bioinformatics and Student programs.

Our audit involved an examination, on a test basis, of evidence supporting the amount of the grant funds incurred, and the amount of the income received on the Project. This included an examination of the University's financial records, and receipts, and an evaluation of the policies and procedures used to calculate the expenditure on the Project. These procedures have been undertaken to form an opinion as to whether the methodology used to calculate the expenditure is in accordance with the Agreement, and that the figures stated are true and fair.

This audit opinion expressed in this report has been formed on the above basis.

#### Audit Opinion

We confirm that in our opinion:

- The Statement of Income and Expenditure is true and fair;
- the funding was expended for the project in accordance with the Agreement; and
- The balance of funds as at 31 December 2015 is \$859,630.

RSM Australia  
Chartered Accountants

**WARWICK SPARGO**

Director  
20 September 2016  
Melbourne, Victoria

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## Participants

Until December 2015

- Australian National University
- CSIRO
- Monash University
- The University of Adelaide
- The University of Melbourne
- The University of New South Wales
- The University of Queensland
- The University of Sydney
- The University of Western Australia

From December 2015

- CSIRO
- Bioplatforms Australia
- Association of Australian Medical Research Institutes
- Universities Australia
- EMBL

## Funding and in-kind support

The following in-kind and financial contributions to the EMBL Australia initiative are acknowledged.

### Commonwealth Department of Education and Training

- Supporting Australia's associate membership of EMBL

### Commonwealth Department of Industry

- Super Science Funding—for support of the EMBL Australia research groups and the Australian Bioinformatics Network
- International Science Linkages Grant—to support development of the EMBL Australia Secretariat

### Australian National Data Service

- Financial support to establish the Bioinformatics Resource via a separate agreement with the University of Queensland

### Australian Research Council

- Financial support for Faculty Development Program (Dr Marcus Heisler)

### Bioplatforms Australia

- Access to core research facilities and services
- Financial support to establish the EMBL Australia Mirror of the EMBL–EBI Facility at the University of Queensland via a separate agreement with the University of Queensland

### Systems Biology Institute (Japan)

- Financial support to establish SBI Australia

### CSIRO

- Financial contribution to the associate membership subscription
- Accommodation for the Australian Bioinformatics Network

### Flinders University

- Financial support for the South Australian node

### Group of Eight universities

- Support for International PhD Program and preparation of Framework Agreement

### Monash University

- Financial contribution to the associate membership subscription
- Accommodation for the Partner Laboratory groups and access to research facilities
- Accommodation for SBI Australia and access to research facilities
- Office accommodation and corporate support services (including legal and payroll) for EMBL Australia secretariat and research staff

### National Collaborative Research Infrastructure Strategy

- Financial contribution to the associate membership subscription

### South Australian Health and Medical Research Institute

- Accommodation for EMBL Australia research groups





### The University of Queensland

- Financial contribution to the associate membership subscription
- Accommodation for the Bioinformatics Resource (BRAEMBL)

### The University of Sydney

- Financial contribution to the associate membership subscription
- Financial support for Faculty Development Program (Dr Marcus Heisler)

### The University of Western Australia

- Financial contribution to the associate membership subscription

### University of New South Wales

- Financial support for the New South Wales node

### University of South Australia

- Financial support for the South Australian node

### Victorian Department of State Development, Business and Innovation

- Financial support for the establishment of the secretariat
- Financial support for the establishment of SBI Australia
- Financial support for the Enhancing Systems Biology in Victoria program

## Affiliations

EMBL Australia has affiliations with the following organisations:

- Australian Genome Research Facility ([www.agrf.org.au](http://www.agrf.org.au))
- Australian Microscopy and Microanalysis Research Facility ([www.ammrf.org.au](http://www.ammrf.org.au))
- Australian Nuclear Science and Technology Organisation ([www.ansto.gov.au](http://www.ansto.gov.au))
- Australian Phenomics Facility, Australian National University ([apf.anu.edu.au](http://apf.anu.edu.au))
- BioGrid Australia ([www.biogrid.org.au](http://www.biogrid.org.au))
- Bioplatforms Australia ([www.bioplatforms.com.au](http://www.bioplatforms.com.au))
- Systems Biology Institute, Japan ([www.sbi.jp](http://www.sbi.jp))

## Appendix 1. Publications

### 2015 calendar year

1. Angiolini, J., **N. Plachta**, E. Mocskos, V. Levi, *Exploring the dynamics of cell processes through simulations of fluorescence microscopy experiments*. Biophys J, 2015. **108**(11): p. 2613–2618
2. Archer, S.K., N.E. Shirokikh, C.V. Hallwirth, T.H. Beilharz, **T. Preiss**. *Probing the closed-loop model of mRNA translation in living cells*. RNA Biol, 2015. **12**(3): p. 248–54
3. Archer, S.K., N.E. Shirokikh, **T. Preiss**, *Probe-Directed Degradation (PDD) for Flexible Removal of Unwanted cDNA Sequences from RNA-Seq Libraries*. Hum Genet, 2015. **85**: p. 11.15.1–11.15.36
4. Benda A., Y. Ma, **K. Gaus**, *Self-calibrated line-scan STED-FCS to quantify lipid dynamics in model and cell membranes*. Biophys J, 2015. **108**: p. 596–609.
5. **Berger, J.**, T.E. Hall, **P.D. Currie**, *Novel transgenic lines to label sarcolemma and myofibrils of the musculature*. Zebrafish, 2015. **12**(1): p. 124–125
6. Bishop, P.J., C.W. Walmsley, M.J. Phillips, M.R. Quayle, **C.A. Boisvert**, C.R. McHenry, *Oldest pathology in a tetrapod bone illuminates the origin of terrestrial vertebrates*. PLoS One, 2015. **10**(5): p. e0125723.1–18
7. **Boisvert, C.A.**, C.L. Martins, A.G. Edmunds, J. Cocks, **P. Currie**, *Capture, transport, and husbandry of elephant sharks (Callorhynchus milii) adults, eggs, and hatchlings for research and display*. Zoo Biol, 2015. **34**(1): p. 94–98
8. Bouveret, R., A.J. Waardenberg, N. Schonrock, M. Ramialison, T. Doan, D. de Jong, A. Bondue, **G. Kaur**, S. Mohamed, H. Fonoudi, C.M. Chen, M. A Wouters, S. Bhattacharya, **N. Plachta**, S.L. Dunwoodie, G. Chapman, C. Blanpain, R.P. Harvey, *NKX2-5 mutations causative for congenital heart disease retain functionality and are directed to hundreds of targets*. eLife, 2015. **4**: p. e06942
9. Bridge, H., D.A. Leopold, **J.A. Bourne**, *Adaptive pulvinar circuitry supports visual cognition*. Trends in Cognitive Science, 2015. **20**: p. 146–157
10. Cardoso-Weide, L.C., R.C. Cardoso-Penha, **M.W. Da Costa**, A.C. Ferreira, D.P. Carvalho and P.S. Santisteban, *DuOx2 Promoter Regulation by Hormones, Transcriptional Factors and the Coactivator TAZ*. Eur Thyroid J, 2015. **4**(1): p. 6–13
11. Castello A., M.W. Hentze, **T. Preiss**, *Metabolic Enzymes Enjoying New Partnerships as RNABinding Proteins*. Trends Endocrinol. Metab, 2015. **26**(12): 746–757
12. Chan, C.T., C.G. Sobey, M. Lieu, D. Ferens, M.M. Kett, H. Diep, H. Ah Kim, S.M. Krishnan, C.V. Lewis, **E. Salimova**, P. Tipping, A. Vinh, C.S. Samuel, K. Peter, T.J. Guzik, T.S. Kyaw, B.H. Toh, A. Bobik, G.R. Drummond, *Obligatory Role for B Cells in the Development of Angiotensin II-Dependent Hypertension*. Hypertension, 2015. **E-pub**: p. 1–26
13. Cheng, X, E. Hinde, D.M. Owen, S.B. Lowe, P.J. Reece, **K. Gaus**, J. Gooding, *Enhancing Quantum Dots for Bioimaging using Advanced Surface Chemistry and Advanced Optical Microscopy: Application to Silicon Quantum Dots (SiQDs)*. Advanced Materials, 2015. **27**, 614–50.
14. Cotton, L.M., M.L. Meilak, T. Templeton, J.G. Gonzales, A. Nenci, M. Cooney, D. Truman, F. Rodda, A. Lynas, E. Viney, **N. Rosenthal**, D.M. Bianco, M.K. O'Bryan, I.M. Smyth, *Utilising the resources of the International Knockout Mouse Consortium: the Australian experience*. Mamm Genome, 2015. **26**(3–4): p. 142–153
15. **Debuque, R.J., J.W. Godwin**, *Methods for axolotl blood collection, intravenous injection, and efficient leukocyte isolation from peripheral blood and the regenerating limb*, in A. Kumar and A. Simon (eds) *Salamanders in Regeneration Research: Methods and Protocols*, 2015. Methods in Molecular Biology, vol. 1290, Springer: USA. p. 205–226
16. Dickinson P., C. Smith, T. Forster, M. Craigon, A. Ross, M. Khondoker, A. Ivens, **D.J. Lynn**, J. Orme, A. Jackson, P. Lacaze, K. Flanagan, B. Stenson, P. Ghazal, *Whole blood gene expression profiling of neonates with confirmed bacterial sepsis*. Genomics Data, 2015. **3**:41–8
17. Foley C., A. Chapwanya, J.J. Callanan, R. Whiston, R. Miranda-CasoLuengo, J. Lu, W.J. Meijer, **D.J. Lynn**, C. O'Farrelly, K.G. Meade, *Integrated analysis of the local and systemic changes preceding the development of post-partum cytological endometritis*. BMC Genomics, 2015. **16**(1): p. 811



18. Frias, S., K. Bryan, F.S.L. Brinkman, **D.J. Lynn**, *CerebralWeb: a Cytoscape.js plug-in to visualise networks stratified by subcellular localization*. Database, 2015. bav041
19. N.Y. Fu, A.C. Rios, B. Pal, A. Lun, R. Soetanto, K. Liu, T. Beck, F. Vaillant, S.A. Best, P. Bouillet, A. Strasser, **T. Preiss**, G.K. Smyth, G.J. Lindeman, J.E. Visvader, *EGF-mediated induction of Mcl-1 at the switch to lactation is essential for alveolar cell survival*. Nat Cell Biol, 2015. **17**(4): p. 365–75
20. Gallego-Colon, E., R.D. Sampson, S. Sattler, M.D. Schneider, **N. Rosenthal**, J. Tonkin, *Cardiac-Restricted IGF-1Ea Overexpression Reduces the Early Accumulation of Inflammatory Myeloid Cells and Mediates Expression of Extracellular Matrix Remodelling Genes after Myocardial Infarction*. Mediators Inflamm, 2015. **2015**: p. 484357.1–10
21. Ghosh, S., J. Vivar, C.P. Nelson, C. Willenborg, A.V. Segrè, **V.P. Mäkinen**, M. Nikpay, J. Erdmann, S. Blankenberg, C. O'Donnell, W. März, R. Laaksonen, A.F. Stewart, S.E. Epstein, S.H. Shah, C.B. Granger, S.L. Hazen, S. Kathiresan, M.P. Reilly, X. Yang, T. Quertermous, N.J. Samani, H. Schunkert, T.L. Assimes, R. McPherson, *Systems Genetics Analysis of GWAS reveals Novel Associations between Key Biological Processes and Coronary Artery Disease*. Arterioscler Thromb Vasc Biol, 2015. **35**: p. 1712–1722
22. Goldshmit, Y., F. Frisca, J. Kaslin, **A.R. Pinto**, J.-K.K.Y. Tang, A. Pebay, R. Pinkas-Kramarski, **P.D. Currie**, *Decreased anti-regenerative effects after spinal cord injury in spry4<sup>-/-</sup> mice*. Neuroscience, 2015. **287**: p. 104–112
23. Goldshmit, Y., S. Kanner, M. Zacs, F. Frisca, **A.R. Pinto**, **P.D. Currie**, R. Pinkas-Kramarski, *Rapamycin increases neuronal survival, reduces inflammation and astrocyte proliferation after spinal cord injury*. Mol Cell Neurosci, 2015. **68**: p. 82–91
24. Gomez, G.A., R.W. McLachlan, S.K. Wu, E. Moussa, S. Verma, M. Bastiani, R. Priya, R.G. Parton, **K. Gaus**, J. Sap, A.S. Yap, *An RPTP $\alpha$ /Src Family Kinase / Rap1 signaling module recruits Myosin IIB to support contractile tension at apical E-cadherin junctions*. Mol Biol Cell, 2015. **26**(7): p. 1249–1262
25. Gupta, B, K. Mai, S. B. Lowe, D. Wakefield, N. Di Girolamo, **K. Gaus**, J. Gooding, *Ultrasensitive and specific measurement of protease activity using functionalized photonic crystals*. Analytical chemistry, 2015. **87**: p. 9946–9953
26. Gurevich, D., A. Siegel, **P.D. Currie**, *Skeletal myogenesis in the zebrafish and its implications for muscle disease modelling*, in *Vertebrate Myogenesis – Stem Cells and Precursors – Results and Problems in Cell Differentiation*, B. Brand-Saberi, Editor. 2015, Springer: Germany. p. 49–76
27. Harrison, PF, D.R. Powell, C.L. Clancy, **T. Preiss**, P.R. Boag, A. Traven, T. Seemann, T.H. Beilharz. *PAT-seq: A method to study the integration of 3' UTR dynamics with gene-expression in the eukaryotic transcriptome*. RNA, 2015. **21**(8): p. 1502–1510
28. Hendrickson, A, D. Possin, W.C. Kwan, J. Huang, **J.A. Bourne**, *The temporal profile of retinal cell genesis in the marmoset monkey*. Journal of Comparative Neurology, 2015. **524**: p. 1193–207
29. Hendrickson, A, C.E. Warner, D. Possin, J. Huang, W.C. Kwan, **J.A. Bourne**, *Retrograde transneuronal degeneration in the retina and lateral geniculate nucleus of the V1 lesioned marmoset monkey*. Brain Structure and Function, 2015. **220**: p. 351–360
30. Johanson, Z., **C. Boisvert**, A. Maksimenko, **P. Currie**, K. Trinajstic, *Development of the Synarcual in the Elephant Sharks (Holocephali; Chondrichthyes): Implications for Vertebral Formation and Fusion*. PLoS One, 2015. **10**(9): p. e0135138.1–19
31. Kennedy-Lydon, T., **N. Rosenthal**, *REVIEW: Cardiac regeneration: epicardial mediated repair*. Proc Biol Sci, 2015. **282**(1821): p. 1–9

## Appendix 1. Publications (cont.)

32. Knowles, JW, W. Xie, Z. Zhang, C. Chennemsetty, T.L. Assimes, J. Paananen, O. Hansson, J. Pankow, M.O. Goodarzi, I. Carcamo-Orive, A. Morris, Y.-D. Chen, **V.-P. Mäkinen**, A. Ganna, X. Guo, F. Abbasi, D.M. Greenawalt, P. Lum, C. Molony, L. Lind, C. Lindgren, L.J. Raffel, P.S. Tsao, The RISC Consortium, The ULSAM Study, The EUGENE2 Study, The GUARDIAN Consortium, The SAPPHiRe Study, E.E. Schadt, J.I. Rotter, A. Sinaiko, G. Reaven, X. Yang, C.A. Hsiung, L. Groop, H.J. Cordell, M. Laakso, K. Hao, E. Ingelsson, T.M. Frayling, M.N. Weedon, M. Walker, T. Quertermous. *Identification and validation of NAT2 as an insulin sensitivity gene*. *J Clin Invest*, 2015. **125**: p. 1739–1751
33. Levine, RA, A.A. Hagège, D.P. Judge, M. Padala, J.P. Dal-Bianco, E. Aikawa, J. Beaudoin, J. Bischoff, N. Bouatia-Naji, P. Bruneval, J.T. Butcher, A. Carpentier, M. Chaput, A.H. Chester, C. Clusel, F.N. Delling, H.C. Dietz, C. Dina, R. Durst, L. Fernandez-Friera, M.D. Handschumacher, M.O. Jensen, X.P. Jeunemaitre, H.L. Marec, T.L. Tourneau, R.R. Markwald, J. Mérot, E. Messas, D.P. Milan, T. Neri, R.A. Norris, D. Peal, M. Perrocheau, V. Probst, M. Pucéat, **N. Rosenthal**, J. Solis, J.J. Schott, E. Schwammenthal, S.A. Slaugenhaupt, J.K. Song, M.H. Yacoub, Leducq Mitral Transatlantic Network. *Mitral valve disease-morphology and mechanisms*. *Nat Rev Cardiol*. 2015. **12**(12): p. 689–710
34. Ma, Y., E. Hinde, **K. Gaus**, *Nanodomains in biological membranes*. *Essays Biochem*, 2015. **57**: p. 93–107
35. Magenau, A, **K. Gaus**, *3D super-resolution imaging by localization microscopy*. *Meth Mol Biol*. 2015. **1232**: p. 123–36.
36. Magenau, A., D.M. Owen, Y. Yamamoto, J. Tran, J.M. Kwiatek, R.G. Parton, **K. Gaus**, *Discreet and distinct clustering of five model membrane proteins revealed by single molecule localization microscopy*. *Molecular Membr Biol*, 2015. **32**(1): p. 11–18.
37. Mundinano, I.C., **W.C. Kwan, J.A. Bourne**, *Mapping the mosaic sequence of primate visual cortical development*. *Front Neuroanat*, 2015. **9**(Article # A132): p. 1–17
38. **Nim, H.T.**, F. Schreiber, T. Done, **S.E. Boyd**. *Interactive geolocal and coral compositional visualisation of Great Barrier Reef heat stress data*. In *IEEE International Symposium on Big Data Visual Analytics [BDVA 2015]*. 2015. Australia: CSIRO
39. Nim, H.T., **M.B. Furtado, M.W. Costa, H. Kitano, N.A. Rosenthal, S.E. Boyd**, *CARFMAP: A Curated Pathway Map of Cardiac Fibroblasts*. *PLoS One*, 2015. **10**(12): p. e0143274.1–16
40. Nim, H.T., **M.B. Furtado, M.W. Costa, N.A. Rosenthal, H. Kitano, S.E. Boyd**, *VISIONET: intuitive visualisation of overlapping transcription factor networks, with applications in cardiogenic gene discovery*. *BMC Bioinformatics*, 2015. **16**: p. 141.1–7
41. Nim, H.T., S.E. Boyd, **N.A. Rosenthal**, *Systems approaches in integrative cardiac biology: illustrations from cardiac heterocellular signalling studies*. *Prog Biophys Mol Biol*, 2015. **117**(1): p. 69–77
42. Pandzic, E., J. Rossy, **K. Gaus**, *Tracking molecular dynamics without tracking: image correlation of photo-activation microscopy*. *Methods App. Fluoresc*, 2015. **3**: p. 014006.
43. Pearson, H.B., **E. McGlinn**, T.J. Phesse, H. Schluter, A. Srikumar, N.J. Godde, C.B. Woelwer, A. Ryan, W.A. Phillips, M. Ernst, P. Kaur, P. Humbert, *The polarity protein Scrib mediates epidermal development and exerts a tumor suppressive function during skin carcinogenesis*. *Mol Cancer*, 2015. **14**(1): p. 169.1–16
44. Pham, S., T. Tabarin, M. Garvey, C. Pade, J. Rossy, P. Monaghan, A. Hyatt, T. Böcking, A. Leis, **K. Gaus**, J. Mak, *Cryo-electron microscopy and single molecule fluorescent microscopy detect CD4 receptor induced HIV size expansion prior to cell entry*. *Virology*, 2015. **486**: p. 121–133.
45. Pinto, A., A. Illykh, M.J. Ivey, J.T. Kuwabara, M.L. D'Antoni, R. Debuque, A. Chandran, L. Wang, , K. Arora, **N. Rosenthal**, M.D. Tallquist. *Revisiting cardiac cellular composition*. *Circ. Research*, 2015. Dec 3. p. ii: CIRCRESAHA.115.307778. Epub.
46. Samarage, C.R., **M.D. White, Y.D. Alvarez, J.C. Fierro-Gonzalez**, Y. Henon, E.C. Jesudason, **S. Bissiere**, A. Fouras, **N. Plachta**, *Cortical Tension Allocates the First Inner Cells of the Mammalian Embryo*. *Dev Cell*, 2015. **34**(4): p. 435–447



47. Srivastava, M., G. Duan, N. Kershaw, V. Athanasopoulos, J.H.C. Yeo, T. Ose, D. Hu, S.H.J. Brown, S. Jergic, A. Pratama, S. Richards, A. Verma, E.Y. Jones, V. Heissmeyer, **T. Preiss**, N.E. Dixon, M.M.W. Chong, J.J. Babon, C.G. Vinuesa. *Roquin binds microRNA-146a and Argonaute2 to regulate microRNA homeostasis*. Nat Comm, 2015. **6**: p. 1–13
48. Sztal, T.E., M. Zhao, C. Williams, V. Oorschot, A.C. Parslow, A. Giousoh, M. Yuen, T.E. Hall, A. Costin, G. Ramm, P.I. Bird, E.M. Busch-Nentwich, D.L. Stemple, **P.D. Currie**, S.T. Cooper, N.G. Laing, K.J. Nowak, R.J. Bryson-Richardson, *Zebrafish models for nemaline myopathy reveal a spectrum of nemaline bodies contributing to reduced muscle function*. Acta Neuropathol, 2015. **130**: p. 389–406
49. Tonkin, J., **N. Rosenthal**, *PREVIEW: One small step for muscle: a new micropeptide regulates performance*. Cell Metab, 2015. **21**(4): p. 515–516
50. Tonkin, J., L. Temmerman, R.D. Sampson, E. Gallego-Colon, L. Barberi, D. Bilbao, M.D. Schneider, A. Musaro, **N.A. Rosenthal**, *Monocyte/Macrophage-derived IGF-1 Orchestrates Murine Skeletal Muscle Regeneration and Modulates Autocrine Polarization*. Mol Therapy, 2015. **23**(7): p. 1189–1200
51. Trinajstić, K., **C. Boisvert**, J. Long, A. Maksimenko and Z. Johanson, *Pelvic and reproductive structures in placoderms (stem gnathostomes)*. Biol Rev Camb Philos Soc, 2015. **90**(2): p. 467–501
52. Vegh, P., D.A. Magee, N.C. Nalpas, K. Bryan, M.S. McCabe, J.A. Browne, K.M. Conlon, S.V. Gordon, D.G. Bradley, D.E. MacHugh, **D.J. Lynn**, *MicroRNA profiling of the bovine alveolar macrophage response to Mycobacterium bovis infection suggests pathogen survival is enhanced by microRNA regulation of endocytosis and lysosome trafficking*. Tuberculosis, 2015. **95**(1): p. 60–67
53. **Warner, C.E., W.C. Kwan**, D. Wright, L.A. Johnston, G.F. Egan, **J.A. Bourne**, *Preservation of vision by the pulvinar following early-life primary visual cortex lesions*. Curr Biol, 2015. **25**(4): p. 424–434
54. **White, M.D., N. Plachta**, *How adhesion forms the early mammalian embryo*. Curr Top Dev Biol, 2015. **112**: p. 1–17
55. **White, M.D., N. Plachta**, *The first cell fate decision during mammalian development*, in *Stem Cells, Tissue Engineering and Regenerative Medicine*, D. Warburton, Editor. 2015, World Scientific Publishing Co Pte Ltd: Singapore. p. 25–40
56. **Wong, S.F.**, V. Agarwal, J.H. Mansfield, N. Denans, M.G. Schwartz, H.M. Prosser, O. Pourquie, D.P. Bartel, C.J. Tabin, **E. McGlinn**, *Independent regulation of vertebral number and vertebral identity by microRNA-196 paralogs*. Proc Natl Acad Sci U S A, 2015. **112**(35): p. E4884–4893
57. Yaffe, Y., I. Hugger, I.N. Yassaf, J. Shepshelovitch, E.H. Sklan, Y. Elkabetz, A. Yeheskel, M. Pasmanik-Chor, C. Benzing, A. Macmillan, **K. Gaus**, Y. Eshed-Eisenbach, E. Peles, K. Hirschberg, *The myelin proteolipid plasmalogen, forms oligomers and induces liquid ordered membranes in the Golgi apparatus*. J Cell Sci, 2015. **128**: p. 2293–302



## Appendix 2. Grants

New grants commencing 2015			
Primary Chief Investigator	Granting body	Description / Title	Year
Assoc Prof James Bourne	NHMRC Senior Research Fellowship	Senior Research Fellowship	2015–2019
	NHMRC Project Grant	A novel treatment for ischaemic stroke: preclinical assessment in the nonhuman primate	2015–2017
Prof Peter Currie	ARC Discovery Project	Molecular mechanisms that generate muscle cell type diversity	2015–2017
	NHMRC Project Grant	Molecular mechanisms underlying induction of Haematopoietic Stem cells in the embryo	2015–2017
	NHMRC Project Grant	The role of misfolded actin in myopathies	2015–2017
	NHMRC Project Grant	Modelling Emery-Dreifuss muscular dystrophy in zebrafish	2015–2017
	Muscular Dystrophy Association, USA	Using zebrafish congenital muscular dystrophy models to find novel therapies	2015–2018
Prof Katharina Gaus	ARC LIEF Grant	Single molecule imaging laboratory	2015
	ARC LIEF Grant	A cryo-FIBSEM capability for 3D imaging and fabrication of biological and material structures at the nanometer level	2015
	ARC Linkage Project	Image analysis for single molecule localisation microscopy	2015–2017
Dr Hieu Nim	The Pratt Foundation	Richard Pratt Fellowships in Prostate Cancer Research	2015–2017
Dr Nicolas Plachta	Sylvia & Charles Viertel Charity Foundation	Sylvia & Charles Viertel Senior Medical Research Fellowship	2015–2019



Continuing grants			
Primary Chief Investigator	Granting body	Description / Title	Year
<b>Assoc Prof James Bourne</b>	NHMRC Project Grant	A role for the pulvinar nucleus in visual cortical development and plasticity	2013–2015
	ARC Special Research Initiative	Neurogenesis in the injured nonhuman primate neocortex	2014–2017
	European Research Council COREFEAR	Functional wiring of the core neural network of innate fear	2014–2016
	NHMRC Project Grant	Functional Neurogenesis in the Injured Neocortex of the Nonhuman Primate	2014–2016
<b>Dr Sarah Boyd</b>	ARC Discovery Project	Systems modelling of the cardiac fibroblast	2013–2015
	Victorian Department of Development, Business & Innovation	Enhancing Systems Biology Institute Victoria	2013–2015
<b>Assoc Prof Max Cryle</b>	Danish Agency for Science, Technology and Innovation	Evolution of chemical defence in butterflies and moths	2013–2015
<b>Prof Peter Currie</b>	NHMRC Principle Research Fellowship	Genetic basis for skeletal muscle formation in development and disease	2013–2017
	NHMRC Project Grant	The role of scube gene function in hedgehog signal transduction	2012–2015
	NHMRC Project Grant	Modelling laminin mediated adhesion and congenital muscular dystrophy in Zebrafish	2013–2016
	NHMRC Project Grant	Molecular mechanisms that generate and activate muscle stem cells during growth and disease	2013–2015
<b>Prof Katharina Gaus</b>	ARC Centre of Excellence	Advanced Molecular Imaging	2014–2020
	NHMRC	Senior Research Fellowship	2014–2018
	NHMRC Program Grant	Program in membrane interface	2013–2017
	ARC Discovery Project	Nano-scale organisation of focal adhesions	2013–2015
<b>Dr Marcus Heisler</b>	European Research Council Starting Grant	The establishment and function of dorisventral boundaries in plant organs	2011–2015
<b>Assoc Prof David Lynn</b>	The Garnett Passe & Rodney Williams Memorial Foundation Project Grant	Blood serum microRNA biomarkers for detection of oropharyngeal cancer	2015–2017
	Australian Hotels Association (South Australia) Hotel Care Community Projects	Funding for high-performance computing infrastructure for Bioinformatics at SAHMRI	2014–2016
	European Research Commission Seventh Framework Programme-HEALTH	PRIMES – Protein interaction machines in oncogenic EGF receptor signaling	2011–2016

## Appendix 2. Grants (cont.)

Continuing grants			
Primary Chief Investigator	Granting body	Description / Title	Year
Dr Edwina McGlenn	NHMRC Project Grant	Elucidating the role of miR-196 in formation of the axial skeleton	2013–2015
	NHMRC Project Grant	Redefining proprioceptive circuitry at a molecular level	2014–2016
Dr Nicolas Plachta	NHMRC Project Grant	Revealing how transcription factors search the DNA to control preimplantation development in mammals	2013–2015
	NHMRC Project Grant	Revealing how the mammalian preimplantation embryo undergoes compaction	2014–2016
Prof Thomas Preiss	NHMRC Project Grant	Charting the interface between cellular metabolic states and gene regulation	2013–2015
	ARC Discovery Project	Tracking factor footprints to reveal the intricacy and control of translation initiation	2013–2015
	NHMRC Project Grant	Characterising the topology and function of the human m5C RNA methylome	2014–2016
Prof Nadia Rosenthal	ARC Special Research Initiative	ARC Stem Cells Australia Strategic Grant	2011–2015
	MESOBLAST	Understanding the complex mechanism of action of our proprietary mesenchymal precursor (MPC) cells	2013–2016
	NHMRC Australian Fellowship	Enhancing human regeneration: a systems approach	2010–2015
	NHMRC Project Grant, Multi Institutional Agreement	The C-type lectin Mincle exemplifies a new mode of sterile inflammation in cardiovascular disease	2014–2016
	NHMRC Project Grant	Using Nkx2-5 knock-in mouse models to understand complex cardiac diseases	2014–2016
	EUCOMMTools	Tools for functional annotation of the mouse genome	2014–2015

## Appendix 3. Membership of Professional Societies



Organisation	Member/s
American Society for Biochemistry and Molecular Biology	Nadia Rosenthal
American Society for Cell Biology	Nadia Rosenthal
Biochemical Society	James Bourne
Biophysical Society	Maté Biro
European Association for the Study of Diabetes	Ville-Petteri Mäkinen
European Diabetic Nephropathy Study Group	Ville-Petteri Mäkinen
European Molecular Biology Organization	Nadia Rosenthal
German Society for Biochemistry and Molecular Biology	Thomas Preiss
Health Research Council of New Zealand College of Experts	Peter Currie
International Society for Developmental Neuroscience	James Bourne
International Society of Differentiation	Nadia Rosenthal
RNA Society	Chen Davidovich
Royal College of Science	James Bourne
Society for Developmental Biology	Nadia Rosenthal
Society for Muscle Biology	Peter Currie
Society for Neuroscience	James Bourne
Australian Neuroscience Society	James Bourne
Australasian Microarray & Associated Technologies Association	Thomas Preiss
Australasian Society for Immunology	Kat Gaus
Australia and New Zealand Society for Cell and Developmental Biology	Peter Currie, Kat Gaus, Edwina McGlinn, Nadia Rosenthal
Australian Bioinformatics and Computational Biology Society	David Lynn
Australian Diabetes Society	Ville-Petteri Mäkinen
Australian Epigenetics Alliance	Chen Davidovich
Australian Society for Biochemistry and Molecular Biology	Thomas Preiss
Australian Society for Biophysics	Maté Biro
Australian Society for Medical Research	James Bourne, Kat Gaus, Ville-Petteri Mäkinen
Australian Vascular Biology Society	Kat Gaus

## Appendix 4. Journal Editorial Roles

Journal	Editorial role
<i>Biochemical Journal</i>	Kat Gaus, Editorial Board
<i>Biophysical Journal</i>	Kat Gaus, Editorial Board
<i>Development</i>	Peter Currie, Advisory Board
<i>Developmental Biology</i>	Peter Currie, Editorial Board
<i>Differentiation</i>	Nadia Rosenthal, Deputy Editor-in-Chief
<i>FEBS Open Bio</i>	Thomas Preiss, Associate Editor
<i>Frontiers in Cardiovascular Medicine</i>	Ville-Petteri Mäkinen, Review Editor
<i>npj Regenerative Medicine</i>	Nadia Rosenthal, Editor-in-Chief Peter Currie, Associate Editor
<i>PLoS ONE</i>	Kat Gaus, Academic Editor Thomas Preiss, Academic Editor
<i>Scientific Reports</i>	James Bourne, Editorial Board

## Appendix 5. Additional Academic Contributions



Scientist	Activity
<b>Nadia Rosenthal</b>	<p>Scientific Advisory Board, Keystone Symposia (until 2015)</p> <p>Chair, Grant Review Committee, European Research Council (until 2015)</p> <p>Scientific Research Council, The Jackson Laboratory, USA (until 2015)</p> <p>Scientific Advisory Board, Mount Desert Island Biological Laboratories USA</p>
<b>Maté Biro</b>	<p>Board Member of the Alliance for Design and Application in Tissue Engineering</p> <p>Associate Faculty member of Faculty of 1000 (F1000) in Cell Adhesion and Migration</p>
<b>James Bourne</b>	<p>NHMRC Research Committee member (2015)</p>
<b>Peter Currie</b>	<p>Scientific Advisory Board of the Global Facioscapulohumeral Muscular Dystrophy Association</p> <p>Scientific Advisory Board of the British Heart Foundation Centre of Research Excellence, University of Edinburgh</p> <p>Interim Board of Directors (Asia/Pacific representative), International Zebrafish Society</p> <p>International Steering Committee on Zebrafish Research</p> <p>Australian Academy of Science National Committee of Cell Developmental Biology</p>
<b>Kat Gaus</b>	<p>Independent Evaluation Board, Euro Bioluminescence</p> <p>Scientific Advisory Board, Leica Scientific Forum</p>
<b>Ville-Petteri Mäkinen</b>	<p>Assessor panel for possible scientific misconduct, VTT Technical Research Centre of Finland Ltd</p>
<b>David Lynn</b>	<p>Senior Clinical Fellowship Reviewer – Medical Research Council, UK (2015)</p> <p>Grant Reviewer – NHMRC, Australia (2015)</p> <p>Grant Review Panel Member – Genetics; Molecular Biology; Bioinformatics and Computational Biology Panel. NHMRC, Canberra, Australia (2016)</p> <p>Joint coordinator, SAHMRI bioinformatics journal club and seminar series (with the University of Adelaide and SA Pathology)</p>
<b>Thomas Preiss</b>	<p>ANU Regional Reference Group Europe</p> <p>Early Career Academic Development Committee CMBE/ANU (until 2015)</p> <p>Board member and secretary, Lorne Genome Inc.</p> <p>Advisor to the National Institute of Health Common Fund Epitranscriptomics Working Group, USA</p>







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