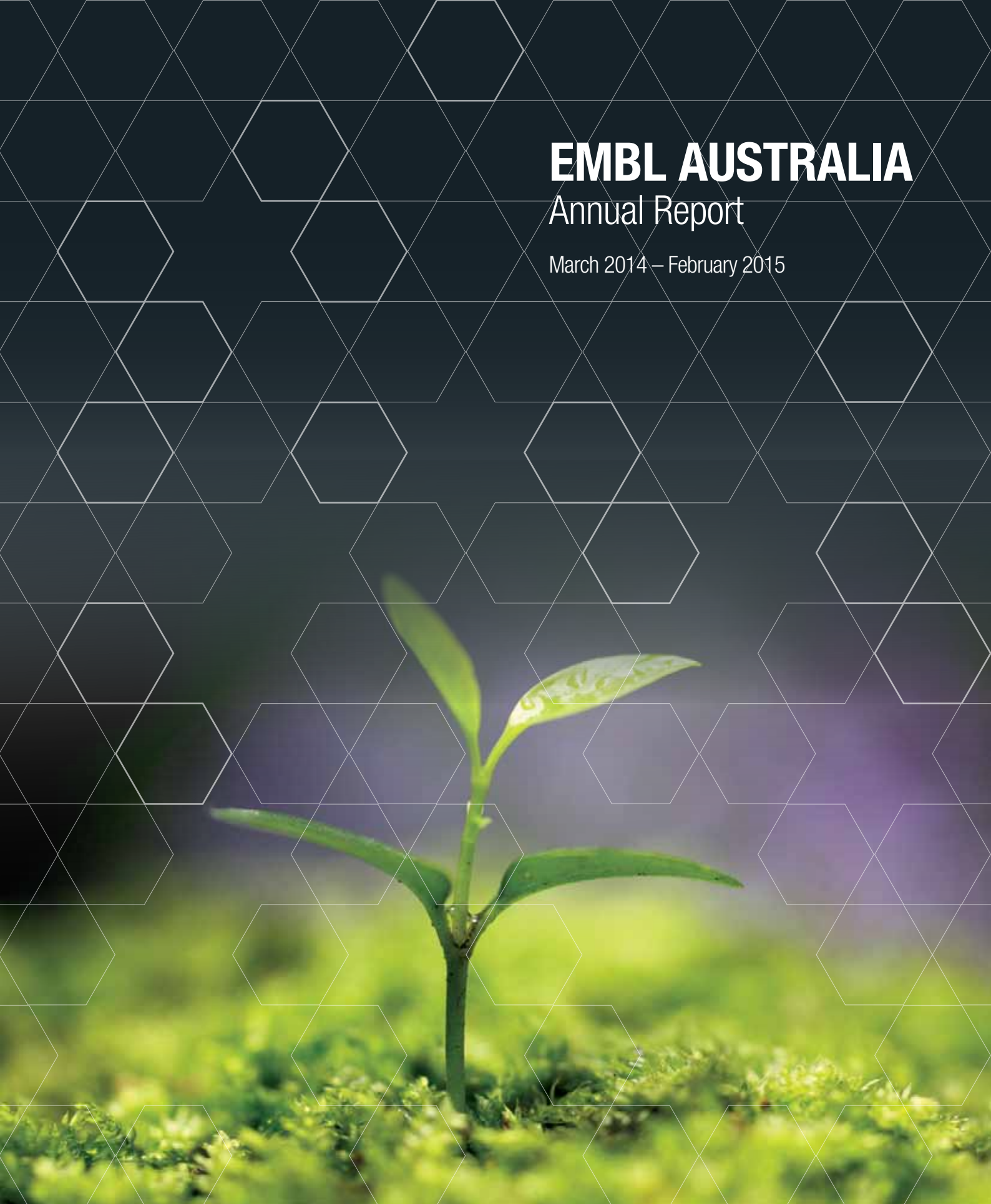


EMBL AUSTRALIA

Annual Report

March 2014 – February 2015



EMBL
Australia



EMBL AUSTRALIA

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

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.

The Australian Government and EMBL have agreed to extend Australia's associate membership to 30 June 2015, and further subject to the availability of funding.

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.

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 (one of the NSW group leaders is currently based at EMBL in Heidelberg, Germany), Queensland and the ACT (to December 2014)
- a nationwide reach through student and training programs, bioinformatics resources and bioinformatics network
- international linkages through EMBL, the European Bioinformatics Institute, and the Systems Biology Institute in Japan.

EMBL Australia is a joint venture between the Group of Eight universities and CSIRO, supported by NCRIS, the National Research Infrastructure for Australia.

NCRIS
National Research
Infrastructure for Australia
An Australian Government Initiative

CONTENTS

Report of the Chair of EMBL Australia Council	2
Report of the Scientific Head	3
About EMBL Australia	4
2014 Highlights	9
2015 Outlook	13
Life sciences research programs	14
Initiatives to support Australian life sciences	26
Student training and support	44
Visitors and activities	54
Australia-EMBL Interactions	57
Outreach and communication	58
Professional activities	65
Research partners	73
Governance	74
Staff	78
Funding and stakeholders	81
Contact EMBL Australia	85

REPORT OF THE CHAIR OF EMBL AUSTRALIA COUNCIL



The past year has seen EMBL Australia expand considerably, with our node at the South Australian Health and Medical Research Institute becoming firmly established and a new node created at the University of New South Wales. Both these nodes are recruiting group leaders for further expansion,

as are the Victorian node at the Australian Regenerative Medicine Institute at Monash University and a new node at the Centre of Excellence in Advanced Molecular Imaging, also based at Monash University.

The new agreement with EMBL provides unparalleled access to the most sophisticated infrastructure and expertise located at the network of five EMBL institutes in Europe, including the main institute in Heidelberg and the bioinformatics institute at Hinxton in the UK.

It is clear to us that our programs enhance Australian life sciences and our international relationships.

Our focus on mentoring promising young scientists, such as Nicolas Plachta, Edwina McGlinn, David Lynn and Ville-Petteri Mäkinen, is paying dividends and I congratulate Nicolas on receiving a prestigious 2014 Sylvia and Charles Viertel Fellowship.

Since our student grant programs began in 2012, we have sent more than 100 students to Europe to learn from and forge new connections with their international colleagues.

The annual PhD Course continues to be a great success, bringing together 60 of the brightest life sciences PhD students for an intensive two-week course with faculty drawn from EMBL in Europe as well as Australian EMBL alumni and other leading Australian life scientists. Pleasingly the graduates from the first two courses have launched their own annual symposium.

The EMBL Australia Bioinformatics Resource (BRAEMBL) initiative is providing expertise, software and hardware to help Australian scientists access international data resources and analytical tools as well as share their own molecular data.

The Australian Bioinformatics Network has led the development of a more cohesive bioinformatics community in Australia, in the process becoming the new Australian Bioinformatics and Computational Biology Society, Australia's first professional society for bioinformaticians.

EMBL Australia lets Australian life scientists participate at the highest level in the international medical and life sciences research community. As we move into 2015, we look forward to consolidating EMBL Australia's pre-eminent position in the Australian life sciences community as our programs grow and develop.

I thank EMBL Australia's Executive Director Silvio Tiziani and Scientific Head Nadia Rosenthal, as well as the leadership team and the EMBL Australia Council, for their hard work driving EMBL Australia forward.

Finally, I thank the Australian Government, the Group of Eight universities, CSIRO, EMBL and our partner research institutes for their ongoing support of EMBL Australia.

A handwritten signature in black ink that reads "Richard G. Larkins". The signature is written in a cursive, slightly slanted style.

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

REPORT OF THE SCIENTIFIC HEAD



It gives me great pleasure to report on EMBL Australia's growth and development over the last twelve months.

In particular, our flagship research programs have blossomed with a new node established at the University of New South Wales Centre for Single Molecule Science.

Over the coming year we hope to add further to our group leaders throughout Australia, bringing the total to eleven.

This growth affirms the value of the EMBL Australia model, which offers outstanding young scientists up to nine years of generous funding, allowing them to develop ambitious research programs free of short-term funding constraints.

At the South Australian Health and Medical Research Institute, Group Leaders Ville-Petteri Mäkinen and David Lynn have settled in, establishing their research programs with new collaborations and research directions.

Our Victorian Group Leaders, Edwina McGlenn and Nicolas Plachta, have entered their fourth year at EMBL Australia and are making great progress. Nicolas is to be congratulated on being a 2014 recipient of the Sylvia and Charles Viertel Fellowship. He was also shortlisted for the 2014 Centenary Institute Lawrence Creative Prize. Both these achievements bring recognition of his research at EMBL Australia.

On the student front, the second EMBL Australia PhD Course took place at the Australian National University (ANU) in Canberra with the help of ANU colleagues. The course gave a group of enthusiastic students two weeks of insights into the life sciences and mentoring from a fantastic faculty of local and international scientists.

And, in a first for EMBL Australia, the students from the 2013 EMBL Australia PhD Course ran an excellent, well-attended EMBL Australia PhD Symposium in Sydney for their peers, much as their counterparts at EMBL in Europe do. An exciting roster of international speakers and national students contributed to two days of great science, which looks likely to become an annual event.

Another important milestone for the year was the 2014 International Conference in Systems Biology in Melbourne. As a member of the organising and program committees, I was delighted at the positive feedback, and particularly thank the organising committee, including EMBL Australia's Executive Director Silvio Tiziani, Sarah Boyd from SBI Australia and David Lovell from the Australian Bioinformatics Network, for all their hard work.

Three additional EMBL Australia initiatives have continued to grow and develop this year. The Bioinformatics Resource is working with many research groups to curate and share Australian data. Following a very successful expression of interest process during the year, the Bioinformatics Resource will soon establish new headquarters at the University of Melbourne. I would like to thank the University of Queensland, and especially Graham Cameron, Prof Mark Ragan and their team at the EMBL Australia Bioinformatics Resource, for their support of its inception and early development.

The Australian Bioinformatics Network has this year realised two of its key goals: a professional society for Australian bioinformaticians and a national annual conference for bioinformaticians organised by the society. At the end of 2014, the activities of the Network merged with the newly formed Australian Bioinformatics and Computational Biology Society (ABACBS). It is a timely opportunity to thank David Lovell for his hard work in bringing together Australia's bioinformatics community and we wish him all the best with his move to a new role as head of the School for Electrical Engineering and Computer Science at the Queensland University of Technology.

Finally, Systems Biology Institute (SBI)Australia has continued to grow its research programs, while developing a rich program of symposiums and workshops through its collaboration with the Victorian State Government.

The coming months will be critical to the future of EMBL Australia as we seek the funding to ensure ongoing associate membership status in EMBL. We have secured the first step, agreement between EMBL and the Australian Government. We are now seeking further central funding, as befits the growth in our national programs and our increasing profile within the Australian research community. With this support, we will continue our commitment to internationalising Australian science, providing our talented young scientists with opportunities to further their careers, and developing new tools for life sciences research for the benefit of all Australian life scientists.

A handwritten signature in black ink, which appears to read 'N. Rosenthal'. The signature is fluid and cursive.

Prof Nadia Rosenthal
Scientific Head, EMBL Australia

ABOUT EMBL AUSTRALIA

Life sciences have entered a new age, where researchers can delve deeper than ever before into the intricate workings of genes, cells and tissues. The way that life sciences research is practised 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. Some of the research that our scientists are working on includes:

- 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
- developing new non-invasive imaging techniques for watching embryonic cell division, which could lead to improvements in reproductive medicine and IVF
- discovering what regulates the innate immune response at a systems level—and developing the bioinformatics tools needed to do so
- finding out what sensitises the adaptive immune system to cause autoimmune diseases such as type-1 diabetes and multiple sclerosis
- looking for links between gene and protein expression and metabolic indicators of chronic heart and kidney diseases
- discovering what triggers the formation of the stem cells used in blood transfusions.

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.

Since Australia's associate membership in EMBL began seven years ago, EMBL Australia has grown from an idea to an organisation encompassing: five research teams, with six more in development; three associated initiatives encompassing bioinformatics and systems biology; and a solid program of student training and travel grants.

EMBL associate membership

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 maximises the benefits of Australia's associate membership of EMBL via research support, infrastructure development and training opportunities across Australia.

In late 2014, the Australian Government and EMBL Council agreed to extend Australia's associate membership to June 2015, and beyond if funding for the membership is secured.

Membership is managed by the Australian Government's Department of Education.

**EMBL AUSTRALIA
MENTORS AND NURTURES
OUTSTANDING YOUNG
SCIENTISTS SELECTED FROM
AN INTERNATIONAL POOL BY
OFFERING SOLID FUNDING TO
DRIVE THE DEVELOPMENT OF
NEW RESEARCH.**

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 (as of February 2015).

With nodes in Hinxton (near Cambridge, UK), Grenoble (France), Heidelberg and Hamburg (Germany), and Monterotondo (near Rome, Italy), EMBL comprises about 85 independent research groups and 1760 people from 60 nations.

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.

EMBL achieves goals beyond the reach of individual member states.



From left to right: David Lynn, Laura Crilley, Sarah Boyd, Nicolas Plachta, Nadia Rosenthal, Silvio Tiziani, Edwina McGlenn, Peter Currie, Ville-Petteri Mäkinen. Credit: EMBL Australia

EMBL Australia's objectives

EMBL Australia aims to create 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.

Internationalising Australian research

EMBL Australia links Australian researchers to three 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), which shares terabytes of data with the Australian life sciences community through the EMBL Australia Bioinformatics Resource.
- Japan's Systems Biology Institute (SBI), which is now closely linked to Australian life sciences through the establishment of an Australian node, SBI Australia.

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 supports talented early-career scientists with research support, networking and training.

Research groups

EMBL Australia's flagship program is its research program, 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.

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.

SBI Australia also offers training in a wide range of disciplines to undergraduate and postgraduate students and postdoctoral researchers.

The Australian Bioinformatics Network, which has been transformed into the Australian Bioinformatics and Computational Biology Society, is focused on the science and profession of bioinformatics and computational biology in Australia.

Embedding new enabling tools into Australian life sciences

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

EMBL Australia's initiatives include:

- the Bioinformatics Resource, which provides access to EMBL–EBI's databases and services
- the Australian Bioinformatics Network, now the Australian Bioinformatics and Computational Biology Society, which is developing into a community of bioinformaticians and users of bioinformatics resources across Australia
- SBI Australia, which promotes transnational systems biology research through the sharing of scientific technology, resources and expertise.

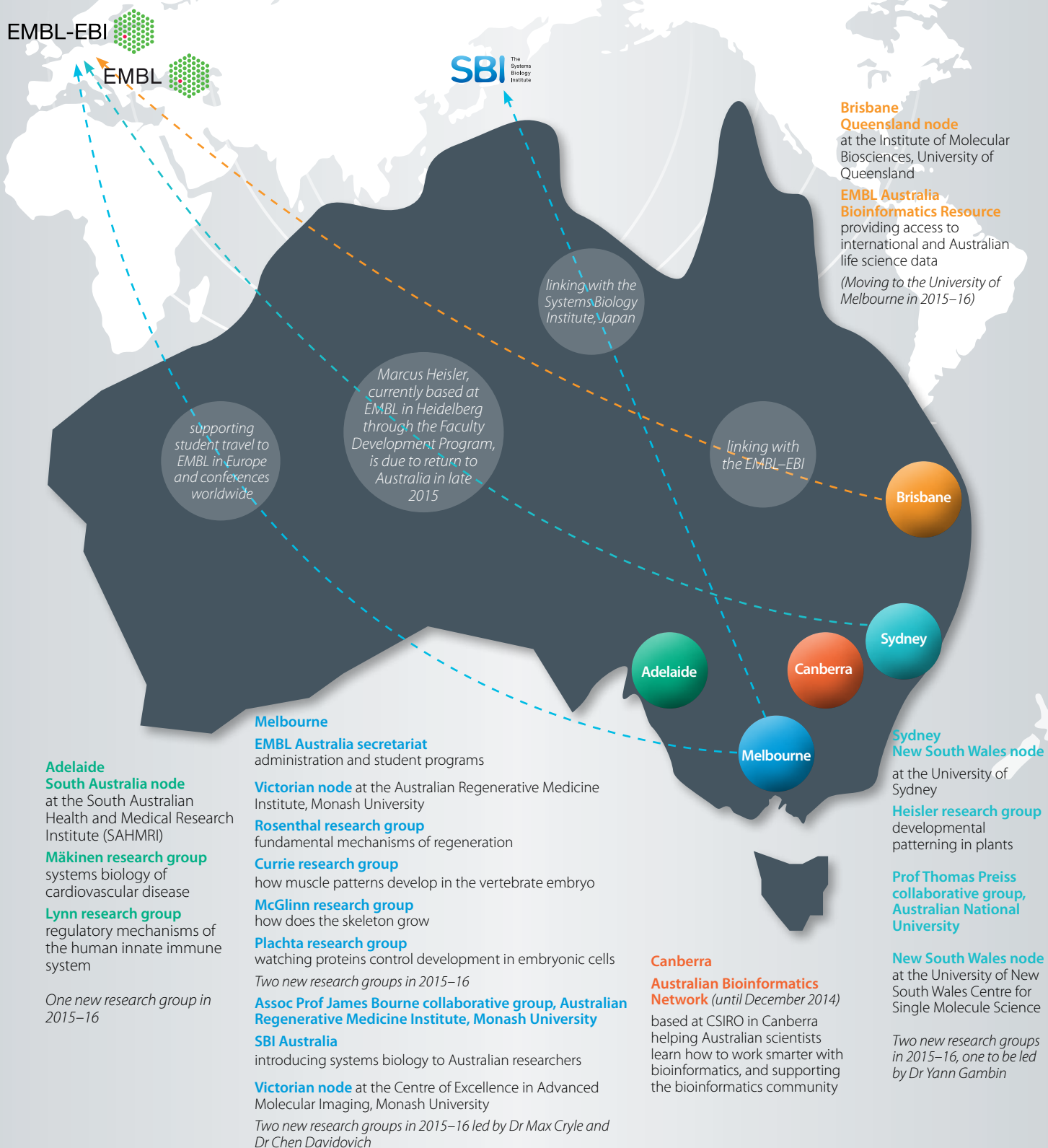
EMBL Australia also supports life sciences research by undertaking joint activities and sharing resources and expertise with a number of affiliate organisations.

**EMBL AUSTRALIA IS
COMMITTED TO CREATING
AND SHARING LIFE SCIENCES
RESOURCES WITH THE
AUSTRALIAN LIFE SCIENCES
COMMUNITY.**



Zebrafish are suitable for detailed study of embryonic development and regeneration. Credit: EMBL Australia

EMBL Australia is well under way with its plans to create a total of 20 research groups around Australia—offering hosting institutions access to the excellence in science and governance and the research infrastructure which drive EMBL and EMBL Australia. It now stands with the secretariat, three initiatives and six established research groups, plus three new group leaders appointed to start soon and recruitment under way for another four.



2014 HIGHLIGHTS

In 2014–15 EMBL Australia has made significant progress to realise the potential of Australia's associate membership of EMBL.

This year has seen concrete steps to more than double the number of EMBL Australia research groups from the current five to eleven by the end of 2015.

The student programs are also growing. In 2014–15 more students than ever before engaged in EMBL Australia's programs and were funded to travel to overseas collaborators.

The EMBL Australia initiatives also matured this year. The Australian Bioinformatics Network achieved its twin objectives of establishing a professional society for bioinformaticians and holding an inaugural annual conference. Thanks to a decision by Monash University, SBI Australia will appoint a director at the professor level to take the systems biology initiative to its next stage. The Bioinformatics Resource has also taken steps to update the way it offers bioinformatics services and data access, preparing the way for a new 'hub and spoke' structure based at the University of Melbourne.

EMBL Australia's key role in Australian life sciences was underscored by our role in hosting the 2014 International Conference on Systems Biology in Melbourne. The conference brought together scientists from around the world to see how systems biology can contribute across science, mathematics, industry and health.

**THIS YEAR HAS SEEN
CONCRETE STEPS TO MORE
THAN DOUBLE THE NUMBER OF
EMBL AUSTRALIA RESEARCH
GROUPS FROM THE CURRENT
FIVE TO ELEVEN BY THE
END OF 2015.**

Australia's ongoing EMBL associate member status was strengthened when the Australian Government confirmed its support of EMBL Australia, reaching agreement with EMBL for Australia's associate membership to continue. EMBL Australia is currently examining options for funding the annual membership fee through a combination of member institution contributions and other sources of funding.

More details on progress against each of EMBL Australia's three objectives are outlined below.



The South Australian Health and Medical Research Institute will soon host three EMBL Group Leaders. Credit: SAHMRI

Internationalising Australian research

- The 15th International Conference on Systems Biology (ICSB 2014), hosted by EMBL Australia in Melbourne in September 2014, attracted 362 attendees from Australia and overseas. Keynote speakers included SBI Director Prof Hiroaki Kitano, Dr Lee Hood from the Institute of Systems Biology and other prominent Australian and international researchers.
- EMBL Australia established the EMBL–Australia Collaborating Groups program to recognise Australian researchers involved in significant collaborations with EMBL researchers in Europe. The first two Australian researchers in the program are Prof Thomas Preiss (ANU), who has a long standing collaboration with Dr Matthias Hentze at EMBL Heidelberg, and Assoc Prof James Bourne (ARMI, Monash University), who is collaborating on a European Research Council–funded project with Dr Cornelius Gross from the EMBL Monterotondo (Rome) outstation.
- The European Commission formally approved the addition of the South Australian Health and Medical Research Institute (SAHMRI) as a partner and beneficiary of the PRIMES project, a 13-partner Seventh Framework Programme–funded project (approx. €12 million) that is investigating network rewiring in colorectal cancer. EMBL Australia Group Leader Assoc Prof David Lynn leads the computational biology aspects of this project. More than A\$700,000 in funds will be transferred to SAHMRI to fund this project in David’s group over the next 2.5 years.
- Thirty-one students studying in Australian institutions were funded to attend conferences and workshops in Europe through the EMBL Australia PhD Travel Grants and EMBL PhD Symposium Travel Grants programs.
- International PhD Program student Simone Li, now in her third year of studies at EMBL in Heidelberg, returned to Australia briefly in December to spend time with her Australian collaborator, Prof Thomas Borody at the Centre for Digestive Diseases in New South Wales.
- More visitors now use the Bioinformatics Resource’s services in the USA (31.4%) than Australia (29.7%), in part due to better search engine optimisation on search engines including Google and Bing.
- Two EMBL scientists, Dr Dmitri Svergun from EMBL Hamburg and Dr Vladimir Benes, Head of the Genomics Core Facility at EMBL Heidelberg, visited Australia.
- SBI Australia was visited by Dr Patricia Wecker, from Centre de Recherches Insulaire et Observatoire de l’Environnement in French Polynesia and Rochester University PhD student Thanh Van Tran.
- SBI Australia continued its collaborations with a number of international organisations including the Systems Biology Institute in Japan, Warwick University in the UK and the Centre de Recherches Insulaires et Observatoire de l’Environnement in French Polynesia.



Scientific Head Nadia Rosenthal (L) and Victorian Node Head Peter Currie (R) with Group Leaders Nicolas Plachta and Edwina McGlenn. Credit: David Russell

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

- The EMBL Australia node in Single Molecule Science was established at the University of New South Wales Lowy Cancer Research Centre. Prof Kat Gaus was appointed head of the node and Dr Yann Gambin, from the Institute of Molecular Biology in Queensland, has been offered the first of two EMBL Australia group leader positions.
- Three members of David Lynn's research group relocated to SAHMRI from Ireland, and he hired two postdoctoral fellows and a laboratory technician to work in the group.
- Assoc Prof Ville-Petteri Mäkinen appointed two postdoctoral fellows to his research group at SAHMRI.
- Sixty PhD students from Australian institutions attended the second EMBL Australia PhD Course, held at the John Curtin School of Medicine at Australian National University.
- The inaugural EMBL Australia PhD Symposium was held at the University of New South Wales.
- Recruitment was initiated for five additional group leader positions, two each at Monash University's Centre of Excellence in Advanced Molecular Imaging and the Australian Regenerative Medicine Institute, as well as a third group leader at SAHMRI.
- Group leader positions at the Imaging Centre of Excellence were offered to, and accepted by, Dr Max Cryle and Dr Chen Davidovich. They will take up their positions over the next year.
- David Lynn had his first paper with his SAHMRI affiliation published in *Nature Communications*, and also published four more papers. He established collaborations with several SAHMRI groups and is developing collaborations with researchers in Queensland and in British Columbia, Canada.
- Dr Nicolas Plachta published a review paper with his group in *Current Topics in Developmental Biology*. Nicolas Plachta and Melanie White contributed a chapter to a book.
- Scientific Head Prof Nadia Rosenthal was elected a Fellow of the Academy of Medical Sciences in the UK for her outstanding contributions to advancing medical science, and Nicolas Plachta was awarded a Charles and Sylvia Viertel Charitable Foundation Senior Medical Research Fellowship. Nicolas was also shortlisted for the 2014 Centenary Institute Lawrence Creative Prize.



South Australian Group Leaders David Lynn (top) and Ville-Peteri Mäkinen (bottom). Credit: SAHMRI

Embedding powerful new enabling tools in Australian life sciences

- The Bioinformatics Resource and EMBL Australia published a call for expressions of interest from Australian institutions interested in hosting the main bioinformatic resources hub. Five institutions responded, with the University of Melbourne providing the most compelling case for hosting the hub.
- EMBL Australia and the Australian Institute of Marine Science (AIMS) signed a memorandum of understanding to identify and enable potential opportunities for collaboration between the two organisations.
- With the support of EMBL Australia, CSIRO and Bioplatforms Australia, the Australian Bioinformatics Network led the development of the Australian Bioinformatics and Computational Biology Society (ABACBS), a new professional society for Australian bioinformaticians. Subsequently, the Society merged with the Network, taking over many of its functions and responsibilities.
- The Australian Bioinformatics and Computational Biology Society held its first conference for Australian bioinformaticians.
- The total number of visitors to the Bioinformatics Resource's websites increased by 36%, and returning visitors by 13%, in 2014–15 compared to 2013–14.
- The Bioinformatics Resource RDA (Research Data Australia) Australian Species Collection accounted for 44% of all usage of Bioinformatics Resource services, up from 41% in 2013–14.
- The Bioinformatics Resource's data integration team worked closely with 12 research groups, consortia and organisations in Australia to curate and submit Australian data to global biomolecular databases. They have submitted over three terabytes of data.
- SBI co-hosted its Collaborative Seminar Series with groups including the Baker IDI Heart and Diabetes Institute and the Melbourne Brain Institute.
- The Australian Bioinformatics Network awarded four connection grants to groups across Australia in support of conferences and meetings and to bring the UCSC Genome Browser Workshop back to Australia.
- The Australian Bioinformatics Network grew to about 700 members on its website, up from 600 the previous year, and around 350 on its Yammer site.



The inaugural student-organised EMBL Australia PhD Symposium was held at the University of New South Wales in November 2014. Credit: Katherine Sanders and Laura Baker

2015 OUTLOOK

**BY THE END OF 2015,
EMBL AUSTRALIA WILL HAVE
ATTAINED A KEY ROLE IN
AUSTRALIAN LIFE SCIENCES
RESEARCH, BRINGING TO
FRUITION A NUMBER OF
ACTIVITIES INITIATED
IN 2014.**

Internationalising Australian research

EMBL Australia will:

- continue to create linkages between Australian and European researchers and research agencies
- complete recruitment of leading young researchers who will forge international links for Australian science as EMBL Australia group leaders.

SBI Australia will:

- continue recruitment activities to appoint a director and establish an advisory board to oversee the growth and governance of the organisation
- continue to develop its research program and collaborative projects
- build on the momentum generated by the International Conference on Systems Biology 2014 to continue the conversations between Australian and international systems biologists.

The Bioinformatics Resource will:

- further develop its capacity to share Australian-generated data with the world.

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

EMBL Australia will:

- recruit group leaders for the new UNSW node, the SAHMRI node and the two Monash nodes, to further build the national network and research program
- continue discussions on the development of new and existing nodes
- hold the third annual EMBL Australia PhD Course in Western Australia in July 2015
- continue to facilitate student exchange through the student grant programs
- support the student-run EMBL Australia PhD Symposium.

SBI Australia will:

- continue to develop teaching and training opportunities in systems biology through its research programs and its seminar series.

The Bioinformatics Resource will:

- work with Bioplatforms Australia, CSIRO and the Australian Bioinformatics and Computational Biology Society to bring training opportunities, like the successful UCSC Genome Browser Road Show tours, to Australian life scientists and bioinformaticians.

Embedding powerful new enabling tools in Australian life sciences

EMBL Australia will:

- continue to embrace, introduce and develop new technologies and tools for life scientists through its research programs, collaborations and associations.

SBI Australia will:

- build on its existing research programs in IVF and reproductive systems medicine, coral reef resilience and cardiac homeostasis.

The Bioinformatics Resource will:

- establish a new 'hub and node' structure for its operations, subject to funding, which will allow it to build on its existing base of web services to provide the Australian bioinformatics community with convenient access to bioinformatics services
- continue to work with Australian research groups and consortia to assist with data collation, curation and integration into globally accessible biomolecular databases.

LIFE SCIENCES RESEARCH PROGRAMS

New South Wales node, University of Sydney

Heisler Group: Developmental patterning in plants

Group Leader: Marcus Heisler, EMBL Heidelberg

Marcus Heisler is currently based at EMBL in Heidelberg, Germany, through the EMBL Australia Faculty Development Program (see box).

Marcus and his team are investigating developmental patterning in plants. They are looking at a fundamental question in plant developmental biology: 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 investigating 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.


Using confocal microscope imaging to examine protein localisation and gene expression in the tissues of growing plants, the Heisler Group is asking:

- Does the boundary between dorsal and ventral cell types dictate where organs arise and, if so, how?
- How are the expression domains of the dorsiventral patterning genes regulated?
- How do boundaries between dorsal and ventral cell types control leaf morphology?

Over the last year the Group has made major progress, 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.



MARCUS AND HIS TEAM ARE INVESTIGATING DEVELOPMENTAL PATTERNING IN PLANTS.



The Group has also made progress in understanding how the dorsiventral boundaries are maintained, identifying a regulatory interaction between a set of miRNAs and their targets that is critical to maintaining leaf dorsiventrality.

Research fellows

Tufail Bashir: Control of organ orientation in the *Arabidopsis* flower

Paz Merelo: Downstream targets of KANADI1

Hathi Ram: Genomic approaches to dorsiventral patterning

Sudeep Sahadevon: A bioinformatics-based approach to understanding dorsiventral transcription factor regulation of auxin-triggered morphogenesis

PhD students

Neha Bhatia: Mosaic approaches to understand the coordination of plant cell polarity

Xiulian Yu: Dorsiventral boundaries and morphogenesis

Technicians

Carolyn Ohno

Paola Ruiz Duarte

Faculty Development Program

The EMBL Australia Faculty Development Program supports early-career scientists considered to show high potential in molecular biology research with long-term funding that enables them to establish a research career. The program provides research group leaders with generous funding for five years at an EMBL station in Europe, followed by four years at an Australian institution. Groups are funded by external Australian grants (for example, from the National Health and Medical Research Council (NHMRC) or the Australian Research Council (ARC)) and/or by Australian research institutions.

Marcus Heisler is the first Faculty Development Program appointee and has been based at EMBL in Heidelberg, Germany, since 2009. He leads a research team of nine people, including postdoctoral researchers, PhD students and technical staff. His position is supported by the ARC and the University of Sydney. In 2010, Marcus was awarded a European Research Council Starting Grant for his project 'The establishment and function of dorsiventral boundaries in plant organs', which extended his stay in Germany by 18 months. Marcus will relocate from Heidelberg to the University of Sydney in late 2015 to underpin the New South Wales node of EMBL Australia at the University of Sydney.

Under the current associate membership with EMBL, EMBL Australia can place up to two group leaders at EMBL laboratories at any one time.

South Australian node, SAHMRI

Mäkinen Group: Systems biology of cardiovascular disease

Group Leader: Ville-Petteri Mäkinen, Molecular Life Course Research Group (Molar)

Ville-Petteri Mäkinen joined EMBL Australia in March 2014 as one of two group leaders recruited to the South Australian node of EMBL Australia at SAHMRI, South Australia's state-of-the-art health and medical research institute.

Ville 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. Ultimately, he would like to determine molecular patterns of gene and protein expression, and related metabolic characteristics that are indicative, predictive or causative for chronic and age-related conditions such as obesity, diabetes and cardiovascular disease.

In 2014, Ville published a key report on the integrative genomics of cardiovascular disease in *PLoS Genetics*. He and his colleagues reported the surprising finding that the glyoxalase system may be a key regulator of an antigen-processing network that was genetically perturbed in people with coronary artery disease. The glyoxalase system is also thought to be a critical player in diabetic kidney disease. Ville is launching a large mouse study to investigate if perturbing glyoxalase 1 in the context of different environmental conditions leads to chronic inflammation and vascular diseases.

Ville is currently building up an interdisciplinary research group with the expertise to design multi-omics studies to look at complex and chronic human diseases such as cardiovascular diseases. 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.

At the same time, the Mäkinen Group will apply them to large human metabolomics datasets, focusing on the early changes on the path to type 2 diabetes, and the overall diversity of metabolic phenotypes and their genetic causes in human populations. In the long term, the Group will combine 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.

VILLE DEVELOPS AND USES COMPUTATIONAL APPROACHES TO ANALYSE THE HUGE DATASETS GENERATED BY GENOMICS, TRANSCRIPTOMICS AND METABOLOMICS STUDIES.

Research fellows

Song Gao: A multivariate statistical framework for connecting omics data with clinical endpoints (from Aug 2014)

Stefan Mutter: Dynamic metabolic responses to successive high-fat meals in patients with type 1 diabetes and non-diabetic controls (from Feb 2015)

Lynn Group: Regulatory mechanisms of the human innate immune system

Group Leader: David Lynn

David Lynn has been an EMBL Australia group leader in the Infection & Immunity Theme of SAHMRI since 2014. The Lynn Group is one of the few in Australia that is equally divided between bioinformatics and experimental biology.

The Group's primary research interest is investigating the regulation of the innate immune system from a genome-wide or systems level perspective. To do this, on the wet-lab side, the Lynn Group uses *in vitro* and *in vivo* (mouse) experimental models coupled with systems biology approaches to investigate the regulation of innate and, more recently, adaptive immunity. Recently, the Group has focused on the interplay between the microbiome and the immune system. David is currently investigating how dysregulation of the neonatal gut microbiome (mouse and human) affects subsequent immune responses (for example, to childhood immunisations). David is also developing a strong interest in so-called vaccine non-specific effects—the effects vaccines have on mortality and morbidity that are not explained by the prevention of the targeted diseases—and how certain vaccines can epigenetically train innate immune cells to be more responsive to subsequent unrelated antigens.

On the bioinformatics side, the Lynn Group leads the development of InnateDB.com, an internationally recognised systems biology platform for the computational analysis of innate immunity networks/pathways.

David also leads the computational biology aspects of the PRIMES project, a 13-partner project (approximately €12 million funded by the European Commission) that is investigating network rewiring in colorectal cancer. To facilitate this work the Group has developed several novel pieces of freely available software for network and pathway visualisation and analysis. In 2014, the European Commission formally approved the addition of SAHMRI as a partner and beneficiary of this project.

Senior research fellows

Kenneth Bryan: Protein interaction machines in oncogenic EGFR signalling

Miriam Lynn: The impact of the microbiome on specific and non-specific vaccine responses

Damon Tumes: Epigenetic regulation of innate and adaptive immunity

PhD student/Research assistant

Theodosia Charitou: Information flow analysis of the EGFR network

Honours students

Lisa Schmidt: Transforming malignant graphs into benign ones

Ivan Goenawan: Dynet—A Cytoscape app for the visualisation of dynamic interaction networks

Advanced placement medical student

Damien Drew: Transcriptional reprogramming of immune networks in preterm babies receiving DHA supplementation

Senior software developer

Manuel Bernal-Llinares

Lab technician

Anastasia Sribnaia



**THE LYNN GROUP
LEADS THE DEVELOPMENT
OF INNATEDB.COM,
AN INTERNATIONALLY
RECOGNISED SYSTEMS
BIOLOGY PLATFORM FOR THE
COMPUTATIONAL ANALYSIS
OF INNATE IMMUNITY
NETWORKS/PATHWAYS.**

Victorian node, Australian Regenerative Medicine Institute

McGlinn Group: How does the skeleton grow

Group Leader: Edwina McGlinn

Eddy McGlinn and her group focus on the importance of microRNA (miRNA) regulation in embryonic development. MicroRNAs are small RNA molecules, found in plants, animals and some viruses, that control the expression of genes—increasing or decreasing the output of gene products such as proteins.

The McGlinn Group's particular emphasis is on how miRNAs control the expression of Hox genes, which are critical in the regulation of many aspects of embryonic development. Furthermore, impairment of the regulation of Hox genes underlies many human diseases. The miR-196 family of miRNAs, which are located within a Hox cluster, are predicted to regulate the expression of up to 10 Hox genes.

Over the last four years, the McGlinn Group has built a vast array of genetic tools with which to assess the function of this evolutionarily conserved miRNA family.

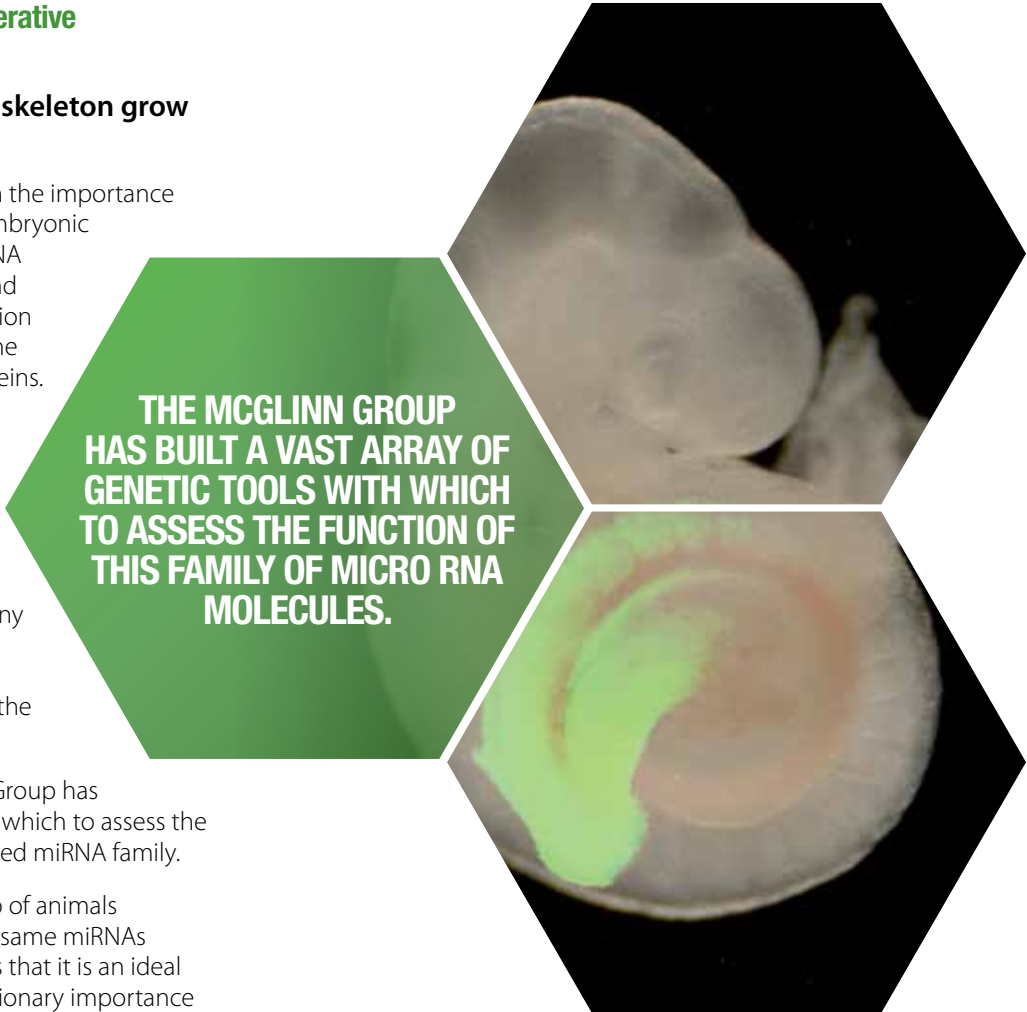
Moreover, the fact that a broad sweep of animals from flatworms to primates show the same miRNAs embedded within Hox clusters means that it is an ideal system in which to analyse the evolutionary importance of miRNA acquisition in shaping the morphology of different animal lineages.

Research fellows

Jesus Casanova: microRNA control of vertebral number and identity (until Dec 2014)

Alysha Heimberg: The evolution of Hox cluster embedded microRNA genes (until Jul 2014)

Olivier Serralbo: Hox genes in spinocerebellar circuitry



THE MCGLINN GROUP HAS BUILT A VAST ARRAY OF GENETIC TOOLS WITH WHICH TO ASSESS THE FUNCTION OF THIS FAMILY OF MICRO RNA MOLECULES.

PhD student

Eamon Coughlin: miR-196 in the development of the CNS

Research assistant

Lisa Wong

Plachta Group: Watching proteins control development in embryonic cells

Group Leader: Nicolas Plachta

Revealing the dynamic mechanisms that pattern a mammalian embryo is fundamental to understanding human biology and disease. Yet few experimental systems permit the study of dynamic physical aspects of cells and molecules in living mammalian embryos.

The Plachta Group combines single-cell imaging and quantitative methods to discover how the dynamic behaviour of DNA-binding molecules controls the development of the first specialised cells in living mouse embryos. The Group recently established new experimental assays to visualise the movement in four dimensions (x, y, z and time) of transcription factors, which are key regulatory molecules controlling gene expression.

Plachta Group experiments are undertaken at the single-cell level, in real time, in intact embryos. Thus the Group can probe biochemical events that are typically studied in fixed specimens or homogenised cell preparations that lack the spatiotemporal dynamics of living systems.

These studies are extended by comparing pluripotent cells in the embryo (that is, cells that can give rise to many different tissues) to several stem cell lines cultured in vitro—those derived from the actual embryo (embryonic stem cells) or those reprogrammed from somatic cell lineages (known as induced pluripotent stem (iPS) cells).

In addition, the Group has developed live-imaging tools to study the cellular mechanisms governing the formation of the first tissue-like structures in the embryo, with a particular focus on cell movements and formation of the central nervous system.

Understanding how you began

In November 2014, Dr Nicolas Plachta was one of just three researchers in Australia to be awarded a Sylvia and Charles Viertel Charitable Foundation Senior Medical Research Fellowship. The Fellowship, which includes \$1,225,000 in funding, will allow Nicolas to continue his study of how embryos form, using pioneering live-imaging technologies to discover how single cells activate different genetic programs and how they regulate their shape.

“Each cell in our body must carefully choose its fate, shape and the way it interacts with other cells, yet we don’t know how these decisions are controlled in real time in living mammals,” says Nicolas. “Understanding these dynamic processes will make it possible to screen IVF embryos for deformities and explain the mechanisms behind tissue formation.”

For Nicolas, the Fellowship funding presents the opportunity to follow creative ideas and curiosity in his research.

As Nicolas stated on receiving the award, “It is crucial that young researchers are given support at the start of their careers and I am thrilled that the Foundation has selected me. Their support will give me the freedom to conduct ambitious long-term research that would otherwise be very difficult to fund”.

Awards

Nicolas Plachta was awarded a 2014 Charles and Sylvia Viertel Charitable Foundation Senior Medical Research Fellowship.

Nicolas Plachta was a finalist in the 2014 Centenary Institute Lawrence Creative Prize.

Research fellows

Stephanie Bissiere: Imaging the mechanical forces patterning mouse embryos

Yanina Alvarez: Imaging protein dynamics during early mammalian development (from Jun 2014)

Stephen Mieruszynski: Imaging protein dynamics during early mammalian development (until Feb 2015)

Melanie White: Imaging the early events patterning in mammalian embryos

Jennifer Zenker: Revealing the mechanisms controlling transcription factor dynamics in single cells

Research assistant

Juan Silva

Currie Group: How muscle patterns develop in the vertebrate embryo

Group Leader: Peter Currie, Head of EMBL Australia Victorian node, Deputy Director of the Australian Regenerative Medicine Institute

The Currie Group uses the many advantages of zebrafish embryology to dissect molecular mechanisms that act to pattern the vertebrate embryo, and to discover how different muscle cell types have evolved. In particular, the Group is interested in how specific muscle cell types are determined within the developing embryo, how they grow and how they regenerate after injury. Zebrafish are excellent study animals because their embryos are transparent, so the development of internal structures can be observed from outside the whole, living embryo.

Research in the Currie Group focuses on understanding how early embryonic cells are specified to become individual muscle cells later in development. Research concentrates on two different populations of differentiating muscles: those that form the muscles of the head and trunk (axial muscles) and those that generate the muscles of the fins (appendicular muscles).

The Currie Group uses genetic and molecular approaches to dissect the events underlying the specification of axial muscle, and has defined a genetic hierarchy that specifies these cells in the developing embryo.

The appendicular muscles of the zebrafish fin arise in a completely different process of differentiation, and from different embryonic structures. The Group studies how these fin muscle cells are specified and controlled in the developing embryo, and how this process has evolved throughout vertebrate species, examining the embryos of numerous extant fishes in an attempt to answer this question.

Finally, researchers within the Currie Group are intrigued by zebrafish mutations that fail to undergo, or retain, the normal pattern of muscle differentiation within the embryo. Mutations that mirror the onset of human muscular dystrophy are particularly intriguing and the Group has developed zebrafish models of common muscular dystrophies. This analysis may lead to novel understandings of the cell biological and developmental mechanisms that underlie the pathogenesis of this group of diseases.

Discovery of stem cell 'buddy system' brings us closer to a cure for blood disorders

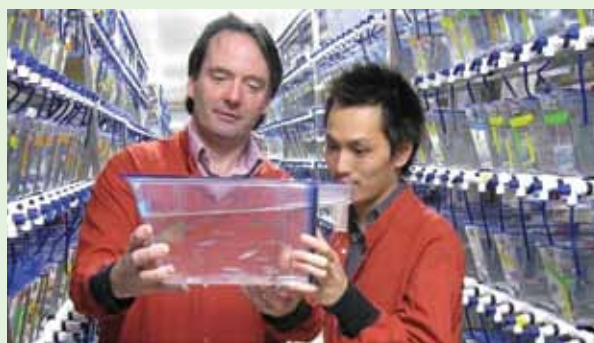
Researchers in the Currie Group are unravelling the mechanics of stem cell generation to help find a cure for a range of blood disorders and immune diseases.

In a paper published in *Nature* in August 2014, EMBL Australia's Victorian Node Head Peter Currie and his team, in collaboration with researchers at the Garvan Institute of Medical Research, identified for the first time the mechanisms that trigger haematopoietic stem cell (HSC) production. HSCs are found in bone marrow and in umbilical cord blood, and are critically important for replenishing the body's supply of blood cells.

Using high-resolution microscopy, the team filmed HSCs forming inside the embryo of the zebrafish, capturing the formation process in detail.

When playing back the films, Peter said they noticed that HSCs required a 'buddy' cell to help them form. These 'buddies', known as endotome cells, have stem cell-inducing properties.

"Endotome cells act like a comfy sofa for pre-HSCs to snuggle into, helping them progress to become fully fledged stem cells," says Peter. "Not only did we identify some of the cells and signals required for HSC formation, we also pinpointed the genes required for endotome formation in the first place."



Peter Currie and Phong Nguyen. Credit: Laura Crilley

Senior research fellow

Joachim Berger: Modelling myopathies in zebrafish

Research fellows

Catherine Boisvert: Skeletal evolution in early gnathostomes

Patricia Jusuf: Specification of nerve cell subtypes in the developing central nervous system

Ivana Mirkovic: Role of scube gene family during vertebrate muscle development

Alasdair Wood: Evaluating therapeutic approaches for congenital muscular dystrophy using laminin-a2 deficient zebrafish

Adjunct research fellow

Yona Goldshmit, Monash University

PhD students

Ophelia Ehrlich: Nanomedicine-based therapies for extracellular matrix diseases

Zhenhua Li: Investigating muscle regeneration in zebrafish muscular dystrophy mutants

Mei Li, Karolinska Institute, Stockholm, Sweden: Using synchrotron radiation to study muscle dynamics in zebrafish larvae (international visiting student)

Wouter Masselink: Cellular interplay of pectoral fin myogenic progenitor cells (until Sep 2014)

Jeremy Ng Chi Kei: Role of intrinsic versus extrinsic cues in cell type determination during development and regeneration (supervised by Patricia Jusuf)

Phong Nguyen: Origins and genetic control of progenitor and stem cells from zebrafish (until Dec 2014)

Avnika Ruparelia: The role of filamin C in muscle function and disease (ARMI affiliate, supervised by Rob Bryson-Richardson, School of Biological Sciences, Monash University)

RESEARCH IN THE CURRIE GROUP FOCUSES ON UNDERSTANDING HOW EARLY EMBRYONIC CELLS ARE SPECIFIED TO BECOME INDIVIDUAL MUSCLE CELLS LATER IN DEVELOPMENT.



Honours student

Liana Goodings: The role of nr4a2a in the central nervous system (supervised by Patricia Jusuf)

Research assistants

Silke Berger

Fruszina Fenyves

Lee Miles (casual)

Carmen Sonntag

Rosenthal Group: Fundamental mechanisms of regeneration

Group Leader: Nadia Rosenthal, Scientific Head of EMBL Australia and Director of the Australian Regenerative Medicine Institute

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

The mouse is our premier model for human development and response to disease but the Group has initiated a program on regeneration in the axolotl (Mexican salamander), and collaboration with other Australian Regenerative Medicine Institute scientists enables comparisons across vertebrate species.

The very different and unique restorative characteristics of species such as the mouse, zebrafish and axolotl provide important clues to the fundamental mechanisms

of regeneration. Salamanders, for example, differ from adult mammals in the way their immune system deals with injury. Like mammalian embryos, they rapidly orchestrate a series of inflammatory events to promote wound healing and tissue replacement of whole structures or organs. In contrast, humans respond to major injuries with persistent inflammation, fibrosis and scarring, which blocks regenerative programs.

Studying the remarkable regenerative potential of embryos and many animal species could help us tackle a range of human degenerative diseases.

The Group's approach is 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.

Stopping the immune system's 'friendly fire'

EMBL Australia and EMBL scientists have found a molecule that could potentially accelerate clinical trials to combat autoimmune diseases.

Autoimmune diseases occur when certain immune cells, called 'pro-inflammatory T-effector cells', become sensitised to specific cells in the body, identifying them as foreign and attacking them just as they would attack invading bacteria. This 'friendly fire' goes unchecked due to the failing of another type of immune cell, called the T-reg, which shuts down T-effector cells when they are not needed.

Lead investigator Nadia Rosenthal and her colleague Dr Daniel Bilbao, from EMBL in Italy, found that a molecule called 'insulin-like growth factor-1' (IGF-1) could play a key role in ensuring the T-reg cells do their job properly.

In laboratory work the researchers created conditions that mimic two of the most common types of autoimmune disease: type 1 diabetes and multiple

sclerosis. They found that administering IGF-1 induced the production of T-reg cells, which in turn suppressed symptoms. Their research showed that IGF-1 acts directly on T-reg cells, and that treated animals had significantly higher survival rates.

Nadia says the findings, published in *EMBO Molecular Medicine*, have clinical significance.

"With these results it will be much easier to start clinical trials for IGF-1 in autoimmune and inflammatory diseases," she says. "It's not a new and untested drug, it's already approved as a therapeutic and has been widely tested under a range of different conditions."

In a separate study, Nadia and Daniel found that IGF-1 also suppresses allergic contact dermatitis, an inflammatory skin disease.

The next phase of the research will see the researchers further explore the role of IGF-1 in inflammation and regeneration, and its potential for treating conditions such as muscular atrophy, fibrosis and heart disease.

Awards

Nadia Rosenthal was elected as a Fellow of the UK's Academy of Medical Sciences in May 2014 for her outstanding contributions to advancing medical science.

Research fellows

Mauro da Costa: The role of cardiac transcription factors in homeostasis and disease

Milena Furtado: Role of fibroblast cardiogenic genes in heart disease and programming

James Godwin: The immunological control of scar-free wound healing and regeneration

Alex Pinto: Biology of macrophages in the injured and uninjured mammalian heart

Lina Wang: Differentiation of cardiomyocytes and macrophages from embryonic stem cells

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

PhD students

Ryan Debuque: Mechanisms of salamander regeneration (co-supervised by James Godwin)

Alexei Illykh: The role of cardiac tissue macrophages in the ageing heart (co-supervised by Alex Pinto)

Julia Wilmanns, Medical University of Hanover, Germany: Using NKX2-5 knock-in mouse models to understand interplay between genetic predisposition and obesity in complex cardiac diseases (international visiting student, supervised by Mauro Da Costa, until Jul 2014)

Honours students

Katya Chan: Investigating inflammatory signalling in salamander limb regeneration (supervised by James Godwin)

Stuart Emmerson: Anterior gradient protein signalling in axolotl salamander limb regeneration (supervised by James Godwin)

**STUDYING THE
REMARKABLE REGENERATIVE
POTENTIAL OF EMBRYOS
AND MANY ANIMAL SPECIES
COULD HELP US TACKLE
A RANGE OF HUMAN
DEGENERATIVE DISEASES.**



Lucy Hersey: Regulation of cardiac angiogenesis by IGF-1 isoforms (supervised by Alex Pinto)

Undergraduate Research Opportunities Program student

Suelyn Van Den Helm: Mechanisms of salamander regeneration (supervised by James Godwin, until Aug 2014)

New nodes of EMBL Australia

In July 2014, EMBL Australia's Council granted approval for the establishment of new EMBL Australia Research Groups to be based at the University of New South Wales. The Centre for Single Molecule Science, headed by Centre Director Prof Kat Gaus, will host two EMBL Australia research groups.

Following an international recruitment program, Dr Yann Gambin, currently an ARC Future Fellow at the Institute of Molecular Bioscience at the University of Queensland, accepted a group leader position in December and will start in mid-2015. A recruitment program for a second group leader has been developed.

In September 2014, four group leader positions at Monash University were also advertised. Two will be located within the Faculty of Biomedical and Psychological Sciences' Biomedical Discovery Institute, with ties to the ARC Centre of Excellence in Advanced Molecular Imaging (Imaging COE). A further two will join the Australian Regenerative Medicine Institute, where the existing Victorian node and EMBL Australia secretariat are based. As of the end of February 2015, positions at the Imaging COE have been offered to, and accepted by, Dr Max Cryle and Dr Chen Davidovich. Interviews were under way for the ARMI positions.

A third group leader will be recruited to SAHMRI in 2015 to join the existing two group leaders.

EMBL Australia collaborative groups

In February 2015 EMBL Australia invited two Australian research leaders, Prof Thomas Preiss and Assoc Prof James Bourne, to become Adjunct Group Leaders to EMBL Australia. These three-year appointments years acknowledge and promote their collaborative research programs with EMBL scientists.

This recognition as an 'EMBL Australia Collaborating Laboratory' is given to an active collaboration between a research group in Australia and an EMBL group that:

- has shared funding and/or grant applications
- has shared bylines on publications
- is, or is expected to be, longstanding (at least two years)
- necessitates geographical exchange of staff and students as appropriate
- is approved as such by the EMBL Australia Scientific Head.

**EMBL AUSTRALIA
ACKNOWLEDGES AND
SUPPORTS SCIENTISTS WHO
PROMOTE THE EXCHANGE OF
INTELLECTUAL AND RELATED
RESOURCES BETWEEN
AUSTRALIA AND EMBL THROUGH
THEIR COLLABORATIVE
RESEARCH PROGRAMS WITH
EMBL GROUPS.**

These exchanges with EMBL scientists also further the exchange of intellectual and related resources between Australia and EMBL.

Thomas Preiss, John Curtin School of Medicine, ANU

Prof Thomas Preiss has a longstanding collaboration with Dr Matthias Hentze at EMBL in Heidelberg, which has grown from his time as an EMBL postdoctoral scientist in Matthias' group (1995–2002). Thomas moved to the Victor Chang Cardiac Research Institute in Sydney in 2002 to establish his own laboratory, and in 2011 relocated to the John Curtin School of Medical Research at ANU as Professor of RNA Biology.

Thomas started collaborating with Matthias again in 2008, first on microRNA biology and more recently on the identification of RNA-binding proteins and potential links between intermediary metabolism and gene regulation via RNA–enzyme interactions.

The collaboration is currently funded by an NHMRC project grant 'Charting the interface between cellular metabolic states and gene regulation', and the two groups work closely together with regular virtual meetings and visits to each other's laboratories.

James Bourne, Australian Regenerative Medicine Institute, Monash University

Assoc Prof James Bourne and his postdoctoral fellow, Claire Warner, have been collaborating with Dr Cornelius Gross at EMBL Monterotondo since 2013.

James established his own group in the Australian Regenerative Medicine Institute at Monash University in 2009, focusing on how the visual brain compensates following damage in early life, using a nonhuman primate model. His postdoc, and former PhD student, Claire Warner received her doctorate in 2014 investigating the role of the pulvinar in visual development and injury.

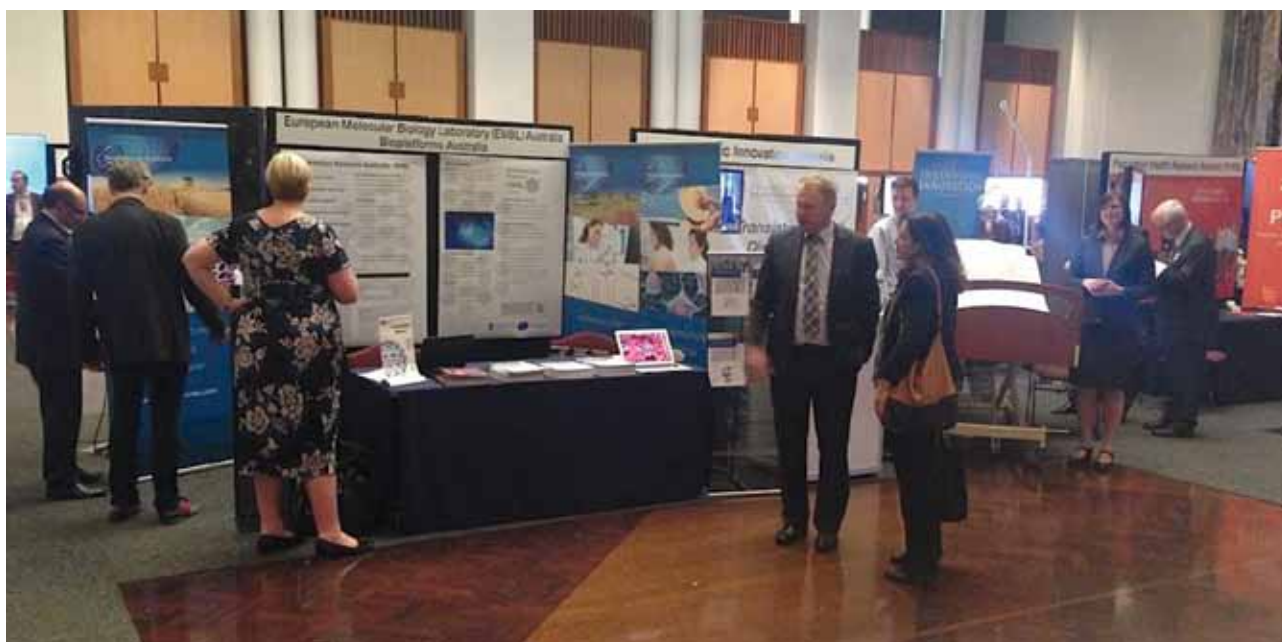
The collaboration with Cornelius Gross centres on the anatomical mapping of primate innate fear pathways in the marmoset using anatomical tract-tracing and in situ hybridisation experiments.

The collaboration is currently funded by a European Research Council Advanced Grant (Seventh Framework Programme) titled 'Functional wiring of the core neural network of innate fear: Mapping connectivity of the primate innate fear network'.

The two groups keep in touch via Skype plus annual visits to each other's laboratories.



Nadia Rosenthal (R) and Janet Thornton, Director of EMBL–EBI in the UK, following their election to the Academy of Medical Sciences.



EMBL Australia exhibited at the National NCRIS Showcase in Canberra (see page 55). Credit: EMBL Australia

INITIATIVES TO SUPPORT AUSTRALIAN LIFE SCIENCES

SBI Australia

About 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.

What is systems biology?

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 acknowledges with gratitude a donation from Ms Marcia Ditterich.

Systems biology research

SBI Australia has research programs in:

- cardiac homeostasis and ageing
- resilience of coral reefs
- IVF and reproductive systems medicine.

Cardiac homeostasis and ageing

SBI Australia partners with the Australian Regenerative Medicine Institute to integrate mathematical, computational and molecular biology research into a systems biology model of a common heart cell, the cardiac fibroblast, to understand its role in cardiac physiology.

The cardiac fibroblast is the most prevalent cell type of the heart but until recently was considered functionally passive. Experimental and computational approaches undertaken at ARMI have provided a novel insight into the cardiac fibroblast as essential for the structure and function of the normal adult heart, and work is under way to improve our understanding of the cell's mechanisms and regulatory pathways.

Postdoctoral researcher Hieu Nim is developing models of the cardiac fibroblast, funded by an Australian Research Council Discovery Grant to Sarah Boyd, Developer of the Systems Biology Research Platform, and Sir Louis Matheson Distinguished Visiting Professor Hiroaki Kitano.

SBI in Japan has a memorandum of understanding with the US Food and Drug Administration to collaboratively develop computational prediction of drug safety, and discussions are under way for Hieu Nim to visit Japan, to link the work on the cardiac fibroblast with the work being done in Tokyo.

IVF and reproductive systems medicine

Understanding reproduction and fertility at the systems level provides a basis for ambitious research programs, including applying stem cells (regenerative medicine) to rejuvenate reproductive function that has declined due to illness or ageing. It could also help doctors more precisely diagnose infertility and make appropriate clinical decisions.

National and international collaborations include Monash IVF, Prince Henry's Institute, Monash University, RMIT and the Systems Biology Institute and RIKEN in Japan. SBI Australia, ARMI and Monash IVF have formalised their collaborative research with a memorandum of understanding. Sarah Boyd is collaborating with Dr Claire Lillee from Monash IVF and Assoc Prof Kais Hamza from the Monash Academy for Cross & Interdisciplinary Mathematical Applications (MAXIMA) on the analysis of preimplantation genetic diagnosis data for improved IVF outcomes.

Collectively, the projects draw on expertise from many disciplines including mathematics and statistics, clinical research, developmental and reproductive biology, engineering, image processing and computer science.

Resilience of coral reefs

Climate change, contamination, introduced species and industrial development are all threatening the Great Barrier Reef—one of Australia's most valuable and unique ecosystems. SBI Australia is working with affiliate Madeleine van Oppen and others at the Australian Institute of Marine Science, and researchers at James Cook University (JCU) and the University of Warwick in the UK, to combine genetics, mathematics and statistics, computational science and visualisation to:

- study the resilience of corals to stressors such as acidification, increased temperature and pesticides
- detect and manage crown of thorns starfish outbreaks
- design linked studies of marine organism regeneration and human regenerative medicine, with the aim of improving understanding and outcomes for both.

The program is strengthened by linkages with the Centre de Recherches Insulaires et Observatoire de l'Environnement in French Polynesia. Marie Curie Research Fellow Dr Patricia Wecker visited in May 2014 with funding from a French mobility grant.

Research fellow Hieu Nim is re-analysing coral bleaching events from 1998 and 2002 with Terry Done from AIMS.

A grant from the Great Barrier Reef Foundation for the project 'Coral health: bleaching and disease' was awarded jointly to JCU, EMBL Australia Scientific Head Nadia Rosenthal and colleagues at the University of Melbourne and Bioplatforms Australia. The project will take a systems approach to develop novel metabolites and protein biomarkers for cellular stress and recovery, to provide a management tool for indexing coral stress exposure and enabling projections of coral regeneration.



The National Sea Simulator at AIMS, where reef resilience can be tested experimentally. Credit: Sarah Boyd

How resilient is our Great Barrier Reef?

It is under threat from every angle—climate change, contamination, introduced species and industrial development. So how do corals cope with all this stress?

Sarah Boyd at SBI Australia is leading a project that uses a systems biology approach to predict and measure the effects of environmental stress on one of our most valuable and unique ecosystems.

Ecosystem health has previously been measured by looking at the number of different species it contains, but there has been a recent shift towards measuring health in terms of 'trait diversity', where traits are used to describe and measure each organism's ecological role and how they interact with the environment.

Trait-based methods have previously been applied to plant ecology, and project member Elizabeth Widman, from the University of Warwick in the UK, has been studying how these methods relate to coral reef ecosystems in Madagascar. Now, SBI Australia has teamed up with the Australian Institute of Marine Science and the University of Warwick to bring this research to the Great Barrier Reef.

"We are trying to find out whether coral reef traits, rather than species, can be used to understand reef resilience to environmental stress," says Sarah. "Understanding the resilience of the Great Barrier Reef to climate change is increasingly critical, especially from the perspective of reef management."

To discuss how a trait-based approach might be applied to corals and other reef organisms, Sarah and her collaborators brought together national and international experts in coral reef ecology, systems biology and reef management for a workshop at AIMS in Queensland in March 2014. The workshop was funded by Great Barrier Reef Foundation.

"This workshop opened up a new approach for scientists and reef managers to better understand and protect the Great Barrier Reef from the impacts of climate change," says Sarah. "Consequently, it generated a great deal of enthusiasm."



Engagement and outreach

SBI Australia's Enhancing Systems Biology program is a comprehensive package of collaboration and training that exposes scientists to the big picture of life sciences systems and technologies, such as human organs and disease, stem cells technologies or metabolomics data and analysis.

Supported by the Victorian Government, the program encourages a culture of networking across disciplines through:

- quarterly collaboratives (networking sessions), where three researchers—one basic, one clinical and one translational—present on their research in a related theme
- visits by international speakers, to showcase international advances in systems biology
- training workshops around specific technical skills for systems biology research.

From March 2014 to February 2015, SBI Australia held five collaboratives and hosted two international visitors.

Teaching

Affiliate Research Fellow Saskia Reibe-Pal taught modelling of larval development to third year mathematics students in the School of Mathematical Sciences, Monash University.

Developer, Systems Biology Research Platform

Sarah Boyd

Sir Louis Matheson Distinguished Visiting Professor

Hiroaki Kitano, Systems Biology Institute (adjunct)

Executive officer

Allen White (until Jun 2014)

Research fellow

Hieu Nim: Systems modelling of the cardiac fibroblast

Project officer/Affiliate research fellow

Dr Saskia Reibe-Pal

Adjunct research fellows

Samik Ghosh, Systems Biology Institute

Yukiko Matsuoka, Systems Biology Institute

Adjunct professor

Madeleine van Oppen, Australian Institute of Marine Science

Visiting PhD student

Thanh Van Tran, Rochester University, USA (Jun–Sep 2014)

Ramialison Group members

Dr Mirana Ramialison, Group Leader

Dr Michael Eichenlaub, Research Fellow

Ms Jeannette Hallab, Research Assistant

Mr Markus Tondl, Research Assistant

International Conference on Systems Biology

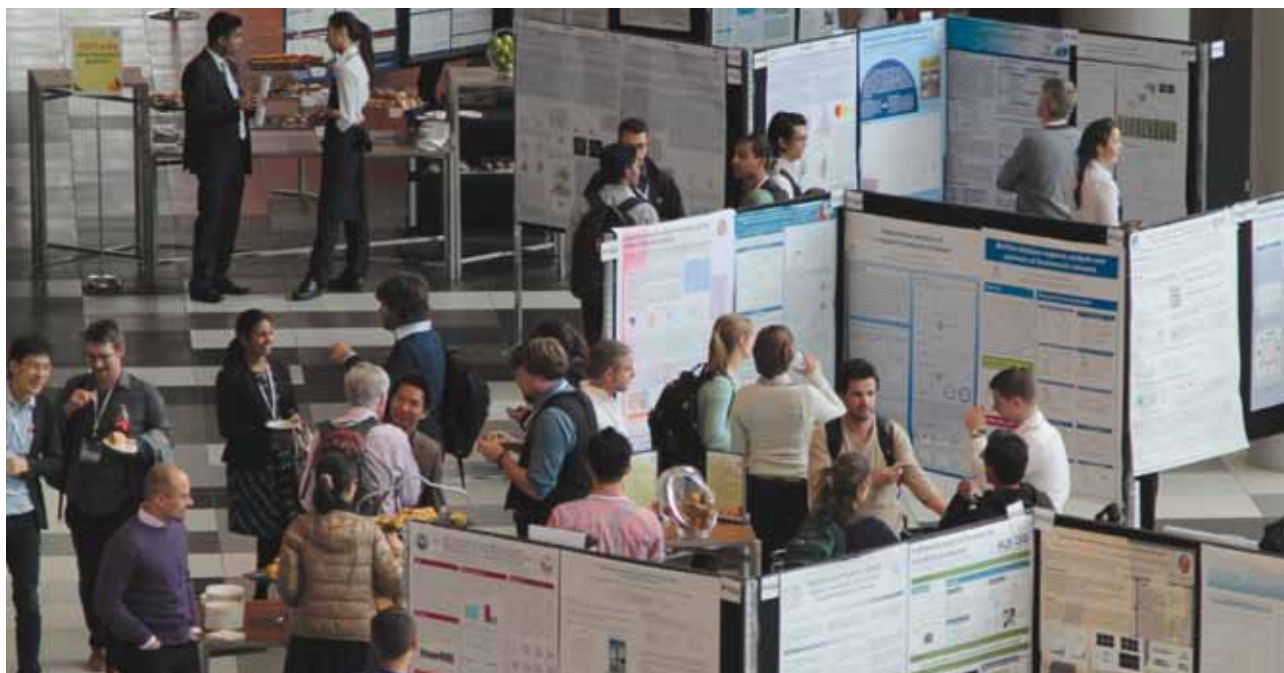
EMBL Australia hosted the 15th International Conference on Systems Biology in Melbourne from 14 to 18 September 2014, with consortium partners including Bioplatforms Australia and CSIRO.

Conference delegates discussed how systems biology can contribute to human health, agriculture and environmental science, industry, modelling complex systems, computational and mathematical challenges and new technologies. Social and ethical issues arising from systems biology research, education, training and government engagement were also covered.

Keynote speakers included:

- Dr Leroy Hood, Institute of Systems Biology, USA—known as an innovator, great thinker and focused on the big vision
- Prof Hiroaki Kitano, Systems Biology Institute, Japan—a pioneer in systems biology, he promotes systems biology research for health care and global sustainability
- Prof Philippe Bastiaens, Max Planck Institute of Molecular Biology, Dortmund, Germany
- Prof Brenda Andrews, Banting and Best Department of Medical Research, Canada
- Prof Hans Westerhoff, University of Amsterdam.

**THE CONFERENCE
ATTRACTED 362 DELEGATES
FROM 36 COUNTRIES,
INCLUDING 124 FROM WITHIN
AUSTRALIA REPRESENTING
35 UNIVERSITIES,
RESEARCH INSTITUTES AND
ORGANISATIONS.**



The poster hall at ICSB 2014. Credit: MCI Melbourne



Lee Hood speaks at ISCB 2014.



The conference audience. Credits: MCI Melbourne.

What can you learn from 100,000 healthy people?

Dr Leroy (Lee) Hood of the Institute for Systems Biology plans to monitor 100,000 healthy people over 20 to 30 years to find out why some stay healthy while others progress to disease. Is it in their genes, nutrition, sleep patterns or microbiome? Is it a combination? How do these factors interact? And how can this information redefine our view of health and disease?

Lee's keynote lecture on systems medicine was one of the highlights of the 15th International Conference on Systems Biology (ICSB 2014), which explored how a systems biology approach is helping to redefine research approaches to understand health, the environment and other biological systems.

"It was great to see international systems biologists of all ages networking, sharing ideas and enjoying Melbourne," says EMBL Australia Head Nadia Rosenthal, who chaired the conference program committee. "Personally, I learned a huge amount of science at the conference. I particularly enjoyed the keynote lecture by Lee Hood. His vision for human health is truly inspiring."

"I heard from several participants that they enjoyed the varied program, which explored the possibilities that systems biology holds for range of research disciplines. That was particularly rewarding, given my very recent engagement with systems biology—I'm glad we got the balance right!" Nadia says.

"Some of the scientific highlights for me were about or from Australia: Elizabeth Murchison's fascinating story about transmissible cancer in Tasmanian devils; Barbara Fazekas' single-cell analysis showing how immunological disease is enormously dependent on environment, and surprises from Ian Small about the nature of sex and suicide in plants. All in all, a real playground for biologists."



The Bioinformatics Resource

The EMBL Australia Bioinformatics Resource aims to help Australian scientists get the most out of bioinformatics—both the data and the analysis tools—and contribute to global bioinformatics in a way that showcases Australian science.

In accordance with EMBL policies that emphasise open access to data, the Bioinformatics Resource provides integrated data services for medical and agricultural sciences, biodiversity and biotechnology.

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.

Bringing European bioinformatics to Australia

The European Bioinformatics Institute (EBI) is one of world's few major centres that provide data and service to support bioinformatics. The EBI is a part of the European Molecular Biology Laboratory and, with Australia's associate membership of EMBL and the creation of EMBL Australia, is a natural collaborator for providing for the bioinformatics needs of Australian scientists, long seen as geographically remote and poorly connected.

The EMBL Australia Bioinformatics Resource was established to provide a mirror (or copy) of EBI-EMBL services for Australia. It was hosted by the Institute for Molecular Bioscience (IMB) at the University of Queensland (UQ). From the beginning, the EBI Mirror has also been integrated with the complementary National Computational Infrastructure Specialised Facility in Bioinformatics (NCI-SFB), which was established to

provide computer power for Australian bioinformaticians, and is hosted by UQ's Research Computing Centre.

These projects are funded through national infrastructure platforms (including Bioplatforms Australia), partners (CSIRO, UQ) and the Queensland Government.

A new 'hub and node' structure

With increasing connectivity direct to EBI services, and consequently less need for a mirror site, the best way for the Bioinformatics Resource to fulfil its role was re-evaluated in 2014 with a survey of Australian bioinformatics needs and activities, coordinated by EMBL Australia.

The Bioinformatics Resource's mission remains to:

- enable optimal exploitation of the tools and data of bioinformatics by Australian scientists
- contribute to the global biomolecular information infrastructure in a way that showcases Australian science
- further these goals by engaging in training and supporting users across Australia.

The review proposed a new model for providing bioinformatics services and capabilities: a hub and several nodes. The hub is the conduit for close collaboration with the European Bioinformatics Institute and the nodes will work closely with the hub and each other to provide local and specialist services.

The Bioinformatics Resource hub will mirror EBI services where it is beneficial and practical but will go a step further to create a part of the EBI in Australia in tight collaboration with the EBI, existing Australian partners (including Bioplatforms Australia, CSIRO and eResearch infrastructures) and the Bioinformatics Resource nodes. This will ensure that Australian scientists's access to bioinformatics data, methods and equipment equals that available anywhere in the world.

EMBL Australia will remain the host of the Bioinformatics Resource, creating a new EMBL senior scientist position, Bioinformatics Resource Director, to oversee the new infrastructure and provide leadership and continuity.

The Director will work with an assembly of stakeholders convened by EMBL Australia including Bioplatforms Australia, CSIRO, appropriate funding agencies, the EBI and a new Australian host organisation. The stakeholders will appoint an independent Scientific Advisory Committee to report to them and the Bioinformatics



Resource Director. Representatives of stakeholders will attend meetings of that committee as observers.

In June 2014, EMBL Australia called for expressions of interest from Australian research institutes to host the new hub for the Bioinformatics Resource. Five institutions submitted expressions, and the University of Melbourne was selected by an international advisory panel as the hub for Bioinformatics Resource activities.

In the meantime, the Bioinformatics Resource has received funding to continue operations until mid-2015.

To achieve the ambitious goals of the new model, the Bioinformatics Resource will require a staff of around 18 full-time equivalent staff at the hub with an annual budget of around \$3.6 million. Each node will need around \$0.5 million each year. Such infrastructure requires continuity, with around 40% of the total funding having long-term (five-year) rolling security, providing a robust springboard from which to seek grant funding. Extension of the core funding should be decided on the basis of periodic stringent review.

Bioinformatics resources and services

The main Bioinformatics Resource website (ebi.org.au) hosts an array of services for life scientists and bioinformaticians. The Bioinformatics Resource provides both the data and the research tools, which researchers can use through a selection of interactive and non-interactive methods. The NCI-SFB team within the Bioinformatics Resource provides customer support.

The data resources include public domain genome, DNA and protein sequences and protein structures. Novel datasets and related capabilities, including integrated data services, are being added.

In conjunction with high-performance computing resources and scalable storage, and delivered through high-bandwidth national research networks, the Bioinformatics Resource enables large-scale integrated analyses that were not previously feasible.

The Bioinformatics Resource operates an array of cloud research tools and data that allows researchers to run analyses such as sequence search and alignment. These services allow open access to data and performance computing infrastructure that otherwise would be a financial and operational burden for research groups.

**43,164 VISITORS
USED THE BIOINFORMATICS
RESOURCE'S EBI MIRROR
SITE AND WEB SERVICES
IN 2014–15.**

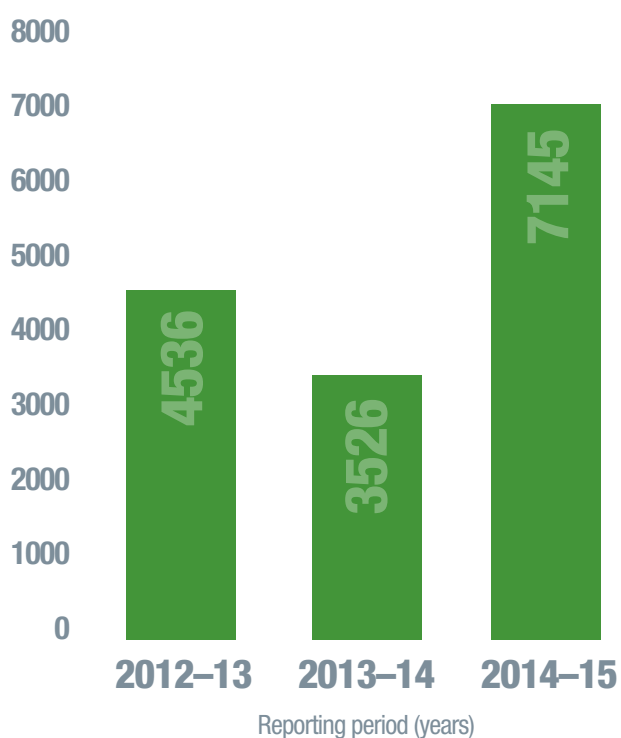
These services are available as a result of our collaboration with EMBL–EBI. The group continues to expand its suite of tools and services, for example, by hosting high-profile tools such as the MEME Suite for Motif Sequence Search developed by Dr Tim Bailey at the University of Queensland.

The 2014 survey identified lack of expertise as the single biggest barrier to exploitation of bioinformatics in Australia. In partnership with Bioplatforms Australia (BPA) and CSIRO, the Bioinformatics Resource will offer extensive user training, continuing the roadshows initiated by BPA and CSIRO. The hub and nodes will also provide help and user support covering the bioinformatics services needs of Australian researchers.

EBI Mirror

The EBI FTP Mirror service was the original service set up by the Bioinformatics Resource in 2010 to give Australian researcher access to, and data downloading from, the EBI's major databanks. Usage of the service more than doubled from 2013–14 to 2014–15. Clearly Australian researchers are continuing to download EBI data for internal use.

Unique visitors to the EBI FTP Mirror service

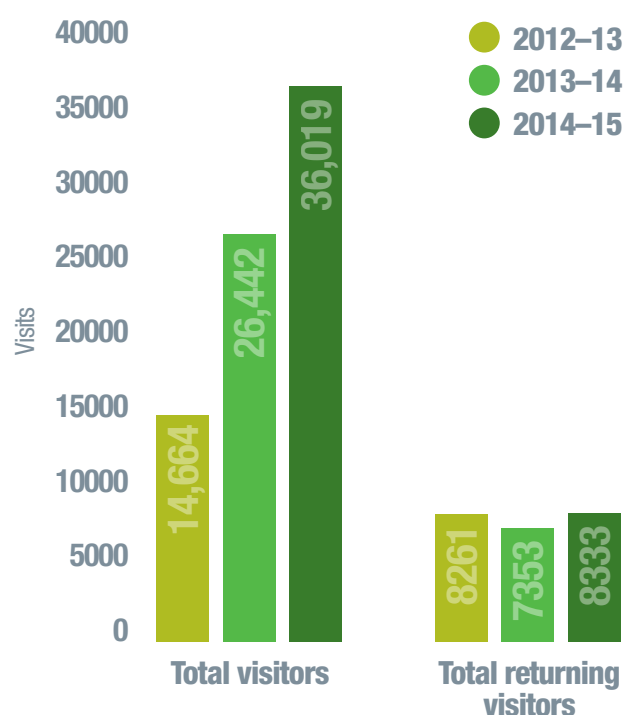


The Bioinformatics Resource web services

The Bioinformatics Resource's web content is optimised for search engines and the site now ranks high in both Google and Bing/Yahoo search results. This has raised the Bioinformatics Resource's profile as a provider of bioinformatics services, and attracted more visitors interested in using the website services, including more international visitors.

From March 2014 to February 2015, the Bioinformatics Resource website attracted more than 36,000 visitors, 36% more than the previous reporting period. Returning visitors also increased by more than 13%, as researchers returned to use the services offered.

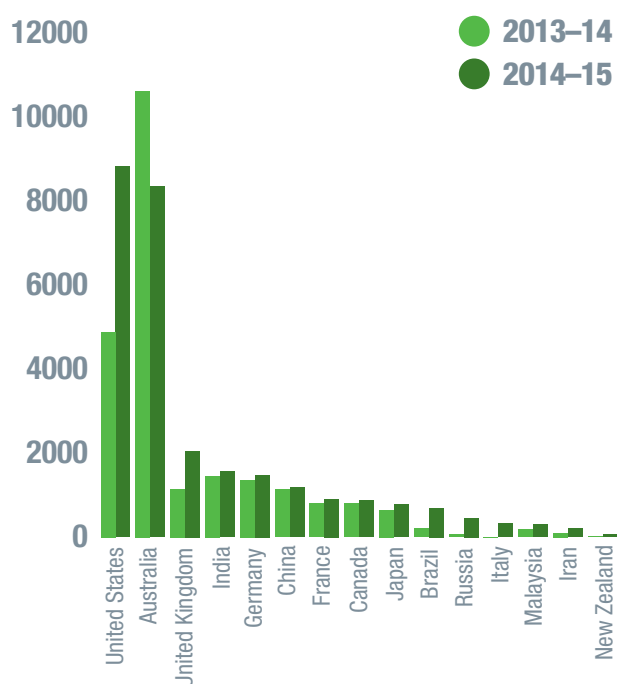
Visitors to the Bioinformatics Resource website



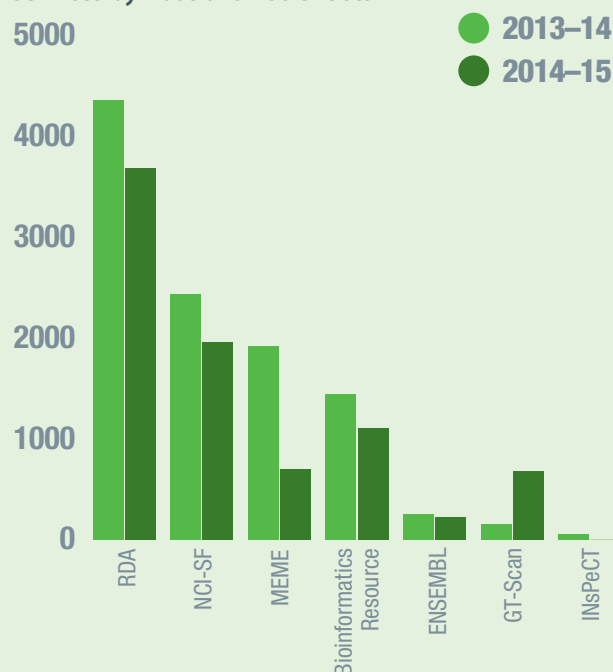
For the first time, Australian visitors (29.7% of total visits) have been marginally outnumbered by visitors from the USA (31.4%). This marks a change from 2013–14 when Australians comprised 45% of visitors compared with 21% from the US.

USA visitors primarily used the MEME Suite, Research Data Australia and the National Computational Infrastructure Specialised Facility in Bioinformatics services (see box for a description of each).

Top user countries



Use of the Bioinformatics Resource web-based services by Australian scientists



RDA (Research Data Australia) is a searchable index of Australian species research data collections, including nucleotide and protein sequences from Australian plant and animal species.

RDA now accounts for 44% of all domestic usage, up from 41% in 2013–14.

NCI-SFB (the National Computational Infrastructure Specialised Facility in Bioinformatics) provides access to the Barrine High-Performance Computing (HPC) cluster, including management of the software and databases, and training and support for users.

The Bioinformatics Resource web services include sequence similarity searches, multiple sequence alignment, protein functional analysis and motif exploration.

MEME Suite provides tools for discovery of motifs in groups of related DNA and protein sequences, comparison with other sequences as well as analysis.

GT-Scan finds optimal targets for genome editing or regulatory interference using CRISPR/Cas or zinc-finger nuclease systems.

Ensembl produces genome databases for vertebrates and other eukaryotic species, and makes this information freely available online.

Data integration

The Bioinformatics Resource data integration team help Australian researchers handle and collate experimental metadata; submit array and next-generation sequencing data to public repositories (including reads, assemblies and annotations); conduct downstream analyses including the EBI Metagenomics Pipeline and the Ensembl Genebuild pipeline; batch submitting large datasets; and use other EBI services.

The data integration team aims to help researchers submit their data and metadata to the relevant repository in the optimal way while meeting the highest international community standards. This will improve the efficiency of the research teams and increase the usefulness, and number of citations, of Australia's bioinformatics data.

The data integration team have already submitted over three terabytes of data to global repositories (see box and table).



Can the Bioinformatics Resource help handle your data?

Showcasing the data from Australia's life sciences projects to the world has become a lot easier thanks to the data integration team at the EMBL Australia Bioinformatics Resource.

The team has been helping Australian scientists with the fiddly, and often burdensome, task of submitting their biomolecular data to EMBL's European Bioinformatics Institute data bank in the UK—one of a handful of centres worldwide that collect, share and make available bioinformatics data.

One of the first groups to use the team's services has been Dr Scott Beatson's group at the University of Queensland.

Scott and his team have a passion for deadly bugs, and are studying the evolution and mobility of genes encoding virulence factors, which are widely conserved among bacterial pathogens.

They are comparing the genomes of important human pathogens, including *Escherichia coli*, *Pseudomonas aeruginosa*, staphylococcus, streptococcus, *Legionella pneumophila* and *Acinetobacter baumannii*, that have been sampled in local clinical settings.

The Bioinformatics Resource's data integration team is helping the group handle the large volumes of raw data generated by their genetic sequencing programs, as well as assisting with data analysis. And the team has set up processes—templates and a batch submission pipeline—to make the task of uploading to the bioinformatics data bank quick and smooth.

Integrating the Beatson group's data into the global database will allow further analysis by the group and other research teams around the world.

To date, the data integration team has successfully chaperoned data on 314 strains of bacteria (including assembled data) from 10 studies to the EBI. Enquiries about other species and from other groups are starting to stream in.

Projects assisted by the Bioinformatics Resource data integration team

Project name and team	Description	Outcome
<p>Sea-quence project ReFuGe 2020 Consortium</p> <p>Bioplatforms Australia, Rio Tinto and the international Reef Future Genomics 2020 consortium</p>	<p>The project aims to sequence genomes and transcriptomes from 10 Great Barrier Reef coral species, as well as associated algal and other microbial symbionts, and compare to similar data from Red Sea coral.</p>	<p>With help from marine biologists involved in the project, the team has created a metadata checklist specific to coral. The data integration team has submitted the project details and the information about the consortium and the Sea-quence project is now publicly available.</p>
<p>Koala genome Consortium of Australian scientists co-led by the Australian Museum's Australian Centre for Wildlife Genomics and Queensland University of Technology</p>	<p>Consortium scientists have teamed up with Port Macquarie Koala Hospital, Australia Zoo Wildlife Hospital and two UNSW centres, the Ramaciotti Centre for Genomics and the Sydney Systems Biology Initiative, to determine the full genome and transcriptome sequence of the koala.</p>	<p>The data integration team has submitted the project details, complete genome and transcriptome sequences from a female koala and the draft genome and transcriptome sequences of a male koala and is continuing to collect sequence data.</p>
<p>Pogona genome project The University of Canberra in collaboration with Beijing Genome Institute (BGI) under the Genome 10K program</p>	<p>The project scientists have sequenced the complete genome of the central bearded dragon <i>Pogona vitticeps</i>. With researchers from around Australia, China and USA, they are developing <i>Pogona</i> as a model for reptile genomics and sex determination.</p>	<p>The data integration team has submitted the project details to the European Nucleotide Archive, as well as genomic data from an individual male and two female dragon lizards. Transcriptome data from four lizards and eight different tissues have also been generated and used to annotate the protein-coding genes in this genome.</p>
<p>Bacterial genome projects Dr Scott Beatson's group at University of Queensland (UQ)</p>	<p>A major focus of the group is the comparative analysis of genomes obtained from local clinical isolates of important human pathogens, particularly the evolution and mobility of genes encoding virulence factors that are widely conserved among bacterial pathogens (see box).</p>	<p>The data integration team has submitted 357GB of data in total from 10 studies, encompassing 314 strains of bacteria.</p> <p>The data integration team developed templates and a batch submission pipeline for the group.</p>

Projects assisted by the Bioinformatics Resource data integration team

Project name and team	Description	Outcome
Spider and other toxins Prof Glenn King's group at the UQ Institute for Molecular Bioscience	The group harnesses the chemistry of venoms from arthropod predators, such as spiders, scorpions and centipedes, to develop novel pharmaceuticals to treat chronic pain and stroke. IMB has very recently announced a new initiative to sequence genomes from several of these groups of organisms.	The data integration team is working with the group to submit their large collection of data. To date, cDNA sequences and assemblies for over 1000 toxin proteins have been submitted, equating to 436GB of data.
	A collaboration has been drawn up between the King group, the Bioinformatics Resource and QFAB Bioinformatics.	The King group's ArachnoServer data resource and a specialised toxin analysis tool, currently called ToxNote, has been updated and developed to aid researchers in venom-based drug discovery.
Oncogenomics project Prof Nick Hayward's group at QIMR Berghofer	The group identifies novel cancer genes and studies the way in which defects in these genes are associated with cancer predisposition or development. In particular they focus on melanoma, oesophageal cancer and endocrine tumours.	The group has used a vast array of platforms in their sequencing projects. Their collection spans a period of 25 years and equates to about 100TB of data.
Marine microbiome project Assoc Prof Justin Seymour's group at the University of Technology Sydney	The group researches the key microbial populations in different ocean ecosystems, and their the ecological and biogeochemical functions. They are developing predictive models of how the dynamics of these systems will shift in response to a changing ocean.	The data integration team has successfully submitted and attributed four projects and 57 libraries to international databases on behalf of the group.
Biomes of Australian soil environments (BASE) Bioplatforms Australia, the Commonwealth Director of National Parks, Western Australian Department of Environment and Conservation, Victorian Department of Environment, Land, Water and Planning, several universities and research and development corporations, and CSIRO	The research group is mapping Australia's soil biodiversity.	The data integration team has successfully submitted 12 samples, equating to 516GB of data for analysis through the metagenomics portal.

Projects assisted by the Bioinformatics Resource data integration team

Project name and team	Description	Outcome
<p>Sugar cane and <i>Burkholderia australis</i> The Australian Centre for Ecogenomics at UQ</p>	<p>The Centre focuses its research on sequence-based analysis of microbial communities. Dr Chanyarat Paungfoo-Lonhienne is investigating how fertilisation regime influences the structure and activity of fungal communities of rhizosphere and bulk soil.</p>	<p>The data integration team has submitted two studies, totalling 144 samples and 50GB of data.</p>
<p>Buruli ulcer <i>Mycobacterium ulcerans</i> Assoc Prof Tim Stinear's group at the University of Melbourne</p>	<p>The group is comparing genome sequences of different strains of <i>Mycobacterium ulcerans</i>, which causes a devastating human skin disease called Buruli ulcer. They aim to develop a molecular assay and establish a diagnostic test for Buruli ulcer, which is a major public health issue in Africa.</p>	<p>The data integration team has successfully submitted four separate studies, consisting of 153 samples and totalling 56GB of data.</p>
<p><i>Eimeria tenella</i> parasite Prof Nick Smith's group at James Cook University</p>	<p>The group is interested in the immune response of hosts to parasites as well as the adaptations of parasites that facilitate their survival, growth, reproduction, virulence and transmission.</p>	<p>The data integration team has successfully submitted data for one study of eight samples, a total of 50GB of data.</p>
<p>Data harvesting collaboration The Bioinformatics Resource and Australian Genome Research Facility (AGRF) collaboration</p>	<p>AGRF next-gen sequencing customers are offered the services of the data integration team and AGRF's LIMs developers and bioinformaticians, who will develop an automated pipeline to upload raw sequencing data and associated metadata to the Bioinformatics Resource. The data integration team will ensure the data is submitted optimally to global databanks.</p>	<p>This collaboration is at the scoping stage, with a pilot collaboration with AGRF on the data harvesting service. Once established, the service will be showcased and also be offered to Ramaciotti and ANU customers.</p>

Director

Dr Sean O'Donoghue

Senior IT and project manager

Gavin D Graham

Bioinformatics manager

Lien Le

Bioinformaticians (support specialists)

Wei-Po (Webber) Liao

Eric Powell

HPC specialists

Dalia Abraham (until Nov 2014)

Kerri Wait (until Feb 2015)

William Hsu (until Dec 2014)

Danny Sheehan

Species specialist

Denis O'Meally (until Aug 2014)

Web and informatics developers

Michael Nuhn

Alexander Varlakov

Outreach, training and communications

Mark Crowe

Executive administration

Lanna Wong



Australian Bioinformatics Network

Setting up an Australian bioinformatics community

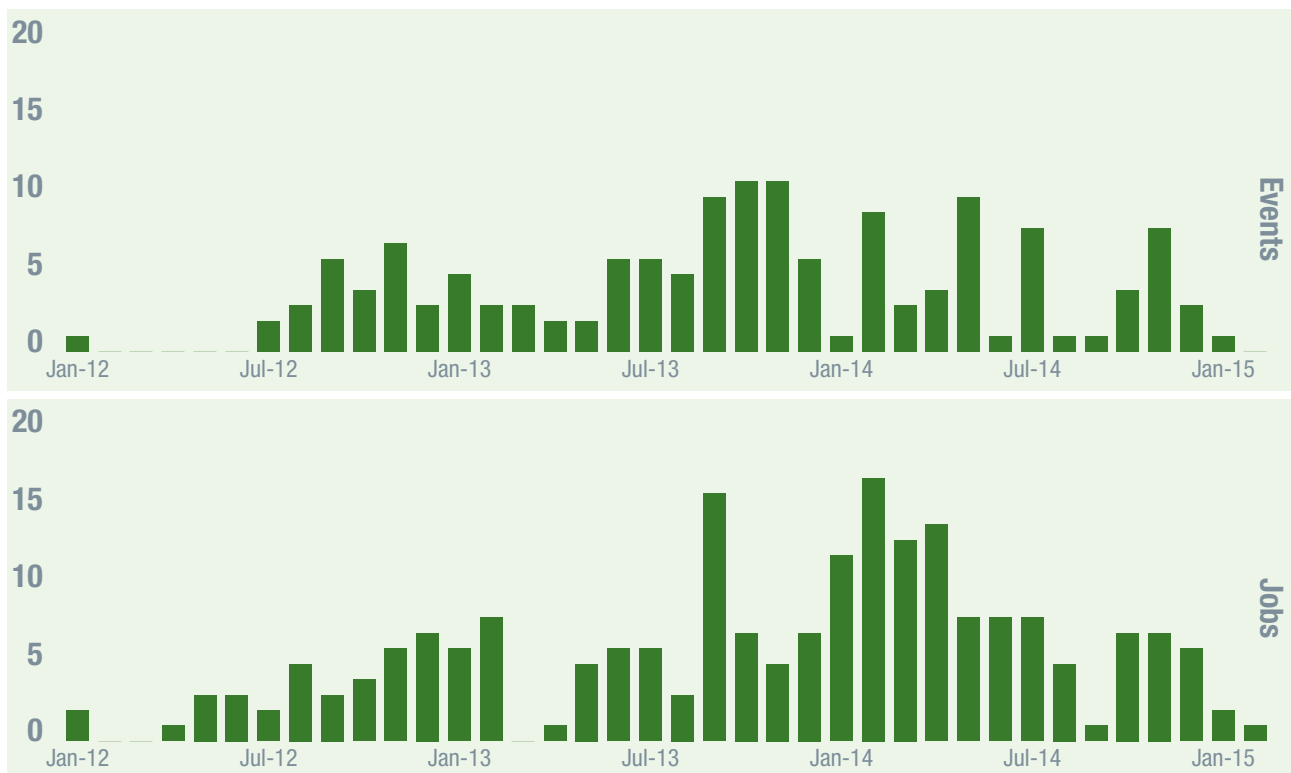
The Australian Bioinformatics Network was launched in mid-2012 with the aim of connecting people, resources and opportunities to increase the benefits Australian bioinformatics can deliver. The independent body, jointly funded by EMBL Australia, Bioplatforms Australia and CSIRO, was initially planned for a five-year period. Dr David Lovell, Bioinformatics and Analytics Leader for CSIRO's Transformational Biology Initiative, was appointed Director in July 2012.

Over the past two and a half years, the Network successfully established itself as a national information hub and forum for the Australian bioinformatics community, and a central resource for sharing and recording information on job opportunities and events.



Sharing resources on SlideShare

Jobs and events posted on AustralianBioinformatics.net



Maturing into a professional society

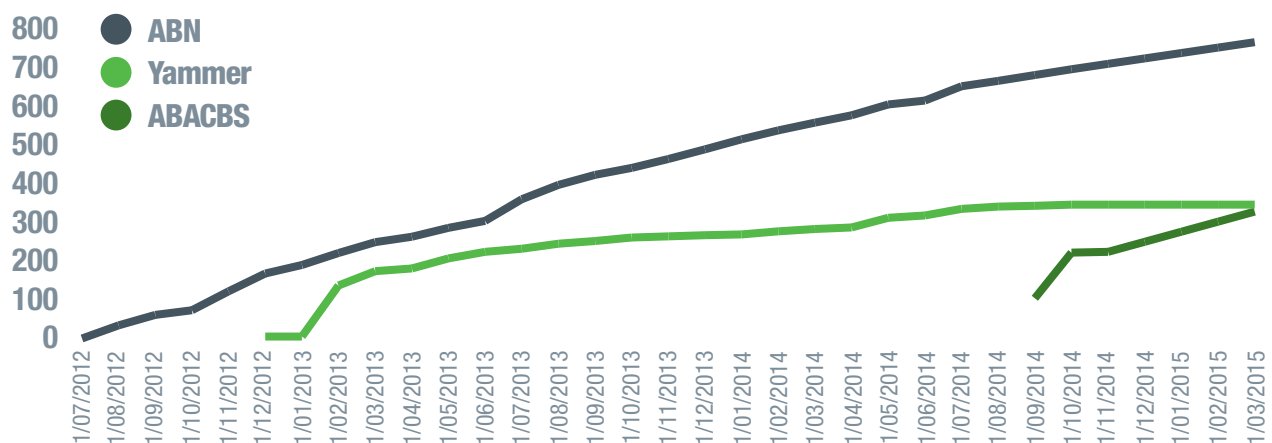
In December 2014, following the departure of David Lovell, the Network's activities transferred to the new Australian Bioinformatics and Computational Biology Society (ABACBS, pronounced 'abacus'), which incorporated in November 2014 and has the continued support of EMBL Australia.

The Society focuses on the science and profession of bioinformatics and computational biology in Australia. It aims to enhance Australian bioinformatics and computational biology by:

- strengthening the science and profession
- encouraging and supporting students
- providing representation and advocacy
- promoting interaction and awareness.

At the time of transfer, the Australian Bioinformatics Network had around 700 members registered on its website australianbioinformatics.net, and around 350 on Yammer, an online discussion forum. The new society had more than 220 members at the time the two bodies merged.

Active memberships



Activities of the Network

In 2014, the Australian Bioinformatics Network supported a number of events through funding and sponsorship, including both the Winter School in Computational Biology and BioInfoSummer, the inaugural Australian Bioinformatics Conference, the UCSC Genome Roadshows and more.

Australian Bioinformatics Conference

Almost 200 bioinformaticians, computational biologists and other quantitative bioscientists gathered at the Murdoch Childrens Research Institute in Melbourne in October 2014 for the inaugural Australian Bioinformatics Conference (ABiC 2014), of which the Australian Bioinformatics Network was a sponsor.

“This was a fantastic way to apply funds from this year’s Australian Bioinformatics Network connection grant scheme. Best of all for me was to see the strong, positive spirit of the Australian bioinformatics community out in force—Australian bioscience needs that!”

David Lovell, Director of the Australian Bioinformatics Network.

Conference highlights included:

- an eye-opening account of the early years of bioinformatics in Australia from Prof Terry Speed
- Dr Belinda Phipson’s talk illustrating how to hunt down unusual methylation patterns
- international keynote speaker C Titus Brown on phenotyping different players in bioinformatics (and their pathologies).

Connection grants

The Australian Bioinformatics Network offers connection grants to fund activities that bring the Australian bioinformatics community together and catalyse new and productive connections for Australian bioinformatics. Eligible activities include travel, support for national and international visitors, and sponsorship of meetings that strengthen professional networks.

Four grants were successful from 14 applications in the 2014 round:

- \$6000 funded the return of the UCSC Genome Browser Roadshow to Australia for a series of seminars and workshops on the use and applications of the Browser in Brisbane, Sydney, Melbourne, Adelaide and Perth.
- \$7000 supported the inaugural Australian Bioinformatics Conference (see box).
- \$8900 supported a fungal bioinformatics satellite meeting, to coincide with an annual meeting on fungal plant pathogens in Canberra in December.
- \$3600 brought a speaker from the Global Organisation for Bioinformatics, Learning, Education and Training (GOBLET) to the 13th International Conference on Bioinformatics (InCoB2014), which was held in Sydney in August 2014.

Director

David Lovell (until Dec 2014)

Executive officer

Benita Vincent (until Jun 2014)

STUDENT TRAINING AND SUPPORT

EMBL Australia's student programs give Australian PhD students access to advanced training and networking opportunities in Australia and overseas.

2014 EMBL Australia PhD Course

The second annual EMBL Australia PhD Course, modelled on the compulsory pre-doctoral training attended by all incoming PhD students at EMBL in Europe, was held at the Australian National University in Canberra in late June and early July 2014.

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.

Sixty first-year and second-year students from around Australia attended the course, which was held at the John Curtin School of Medicine at Australian National University.

The course included symposium-style presentations from 79 Australian and international speakers, as well as workshops and site visits to facilities including the Australian Institute of Sport and Mount Stromlo.

Technical sessions spanned developmental biology, animal models of disease, and crop genetic engineering (among many others), and the course also held sessions in science communication, science policy and science career prospects.

A sold-out public forum, with panellists including Prof Aidan Byrne (CEO of the Australian Research Council), Senator Kate Lundy and Catriona Jackson (CEO of Science and Technology Australia), examined the topic 'Science and politics—like oil and water?' brought 150 members of the general public to the John Curtin School of Medical Research.

The 2015 course will be held at the Harry Perkins Institute of Medical Research in Perth.



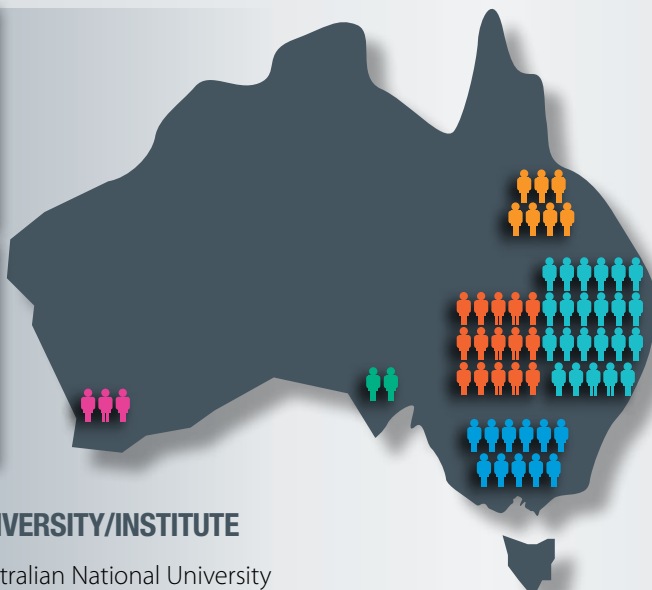
EMBL Australia PhD Course class of 2014

2ND EMBL AUSTRALIA PHD COURSE

SPEAKERS

79
SPEAKERS

60
STUDENTS



STATE UNIVERSITY/INSTITUTE

ACT	Australian National University
NSW	Victor Chang Cardiac Research Institute, Garvan Institute of Medical Research, University of New South Wales, The University of Newcastle, Kolling Institute of Medical Research, Lowy Cancer Research Centre, Centenary Institute, The University of Sydney, University of Wollongong, University of Western Sydney
QLD	Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, QIMR Berghofer Medical Research Institute, Eskitis Institute, Institute of Molecular Bioscience
SA	University of Adelaide, University of South Australia
VIC	University of Melbourne, RMIT, Monash University, CSIRO Australian Animal Health Laboratory, MIMR-PHI
WA	The University of Western Australia

STUDENT DEMOGRAPHICS

Venue:

ANU College of Medicine, Biology & Environment
Australian National University, Canberra

Date:

29 June to July 11 2014

Canberra organising team:

Prof Thomas Preiss
Dr Michael Dobbie
Dr Ruth Arkell
Ms Jackie Stenhouse

Topics:

Gene expression and genomes
Structural biology
RNA regulation
Cell biology
Developmental biology
Neuroscience
Animal models of disease
Bioinformatics
NGS workshop
Imaging workshop
Crop genetic engineering
Systems biology
Translational and clinical sciences
Communications workshop
Science in society

Highlights:

The Hon. Dr Barry Jones, AC:
'Evidence, opinion, interest, the attack on the scientific method'
Public forum:
'Science and politics—like oil and water?'
Panellists Prof Aidan Byrne (CEO, Australian Research Council), Senator Kate Lundy and Catriona Jackson (CEO, Science & Technology Australia)
Australian Institute of Sport and Mt Stromlo visits
Student poster session

Plenary talks by:

Dr Vladimir Benes, European Molecular Biology Laboratory (EMBL)
Prof Anthony Hannan, Florey Institute of Neuroscience & Mental Health, University of Melbourne
Assoc Prof Megan Munsie, Stem Cells Australia
Prof Jenny Graves, La Trobe Institute of Molecular Science, La Trobe University

International PhD Program

The EMBL Australia International PhD Program lets Australian students undertake their PhD at an EMBL facility in Europe. The postgraduate studies are jointly supervised by researchers from EMBL and the student's Australian Group of Eight university with doctorates jointly awarded upon completion.

This program offers Australian students direct exposure to the EMBL philosophy and training. EMBL is renowned for the internationality of its students, the interdisciplinary nature of its training, the dedicated mentoring provided by its supervisors and the early independence granted to its researchers. Opportunities to do a PhD at EMBL are

awarded competitively based on written applications, panel interviews and one-on-one meetings with the researchers. Entry to the program is extremely competitive. In addition to a stipend and a living allowance, the program provides funding to support travel between Australia and EMBL for both the student and their Australian mentor. Students may also use an Australian Postgraduate Award for the program.

EMBL recruits PhD students twice a year, with positions available for up to three Australian students to commence each year. Currently one Australian PhD student, Simone Li, is at EMBL (see box). Simone began her PhD in September 2012.

Simone Li—improving the gut with metagenomics

Simone is in her third year as a PhD candidate based at EMBL Heidelberg under the supervision of Dr Peer Bork, Senior Scientist and Joint Head of EMBL's Structural and Computational Biology Unit and Strategic Head of Bioinformatics.

Her PhD project uses metagenomics—the study of genetic material from environmental samples—to understand how faecal microbiota transplantation therapy could treat, and potentially cure, diseases of the human digestive system. Many of these diseases, such as ulcerative colitis, are believed to arise from changes in the combination of gut microorganisms.

Simone is collaborating with Prof Thomas Borody at the Centre for Digestive Diseases in Sydney, who is a pioneer of the therapy. She hopes the project will improve the efficacy of the treatment, and reduce the number of people suffering these diseases.

Simone reports that her research is progressing well, with a publication due out soon and presentations of her work by her collaborator at the 11th Nestle International Nutrition Symposium in Switzerland in 2014. Simone also attended the Conference of the European Network for Gastrointestinal Health Research, which was held in Germany in September 2014.

Simone has continued her involvement in EMBL's doctoral program as a student representative and has also taught a number of courses at EMBL.



Travel grants

Now in its fourth year, the EMBL Australia travel grants program continues to attract applications from universities and research institutions around Australia. The grants are extremely competitive, with more than 100 applications across the two grant programs offered during the 2014 calendar year.

PhD travel grants

EMBL Australia PhD Travel Grants are for Australian PhD students to visit the EMBL facilities in Europe. The grants cover travel and accommodation expenses and a living allowance for short-term visits of up to six weeks (up to \$3,500), or long-term residencies of up to six months (up to \$7,500).

This gives Australian PhD students the opportunity to attend:

- conferences, symposiums or one of the many short courses operated by EMBL at the International Centre for Advanced Training (EICAT) in Heidelberg, Germany
- one of EMBL's comprehensive suite of courses, conferences and workshops in the life sciences
- laboratories of EMBL to undertake training for periods of up to six months.

There were two rounds of applications for travel in 2014, with nine students travelling to EMBL campuses over the course of the year to attend conferences, courses and laboratory visits.



The EMBL Australia secretariat is based at Monash University in Melbourne. Credit: EMBL Australia

TRAVEL GRANT PROGRAM

ROUND 1 2014

For travel between January 1 and June 30 2014

ROUND 2 2014

For travel between July 1 and December 31 2014

NUMBER OF APPLICATIONS



THIS YEAR THERE WERE TWO ROUNDS OF TRAVEL GRANTS TO ATTEND AN EMBL CONFERENCE, COURSE OR TRAIN IN AN EMBL LABORATORY.

STATE UNIVERSITY/INSTITUTE

- ACT** Australian National University
- NSW** University of New South Wales, ANZAC Research Institute, University of Technology Sydney, University of Western Sydney, Children's Cancer Institute
- NT** Menzies School of Health Research
- QLD** QIMR Berghofer Medical Research Institute, Queensland University of Technology
- SA** University of Adelaide
- VIC** Monash University, Deakin University, University of Melbourne, The Walter and Eliza Hall Institute of Medical Research, Burnet Institute

STATE UNIVERSITY/INSTITUTE

- ACT** Australian National University
- NSW** Garvan Institute of Medical Research, University of New South Wales, University of Sydney, Children's Cancer Institute, CSIRO, Kolling Institute of Medical Research, University of Wollongong, University of Western Sydney, University of Technology Sydney, Macquarie University, St George Clinical School, St Vincent's Centre for Applied Medical Research (AMR)
- QLD** QIMR Berghofer Medical Research Institute, Queensland University of Technology, Institute for Molecular Bioscience (IMB), Bond University, The University of Queensland, Diamantina Institute
- SA** The University of Adelaide
- VIC** Bio21 Molecular Science and Biotechnology Institute, The Walter and Eliza Hall Institute of Medical Research, Monash University, Monash Institute of Pharmaceutical Sciences, Deakin University, The University of Melbourne
- WA** The University of Western Australia, Murdoch University

Funded



Conferences attended

- EMBO Practical Course on Computational Structural Biology—from data to structure to function, European Bioinformatics Institute, United Kingdom, 7–11 April 2014
- 10th Annual BioMalPar I EVIMalaR Conference and EVIMalaR Symposium 'The Highs and The Highs' Biology and Pathology of the Malaria Parasite EMBL Heidelberg, Germany, 12–15 May 2014
- Tumour Microenvironment and Signalling, EMBL Heidelberg, Germany, 7–10 May 2014

Funded



Conferences attended

- Chemical Biology 2014 EMBL Heidelberg, Germany, 20–23 August 2014
- EMBO Practical Course: Single-Cell Gene Expression Analysis EMBL Heidelberg, Germany, 19–24 September 2014
- Next-Generation Sequencing Applications and Data Analysis EMBL Heidelberg, Germany, 6–8 October 2014
- EMBL Introductory course: Statistical Bioinformatics using R and Bioconductor EMBL Heidelberg, Germany, 13–16 October 2014
- High Throughput Microscopy for Systems Biology EMBL Heidelberg, Germany, 20–26 October 2014
- Solution scattering from biological macromolecules EMBL Hamburg, Germany, 27 October–3 November 2014

Laboratory visits

- Heisler laboratory, EMBL Heidelberg, Germany
- Schultz laboratory, EMBL Heidelberg, Germany
- Svergun laboratory, EMBL Hamburg, Germany
- Teichmann laboratory, EBI, Hinxton, UK

PhD Symposium travel grants

EMBL Australia also operates the EMBL PhD Symposium Travel Grants program, which allow students to attend the PhD Symposium in Europe that is organised annually by EMBL's first-year PhD students. Grants to the value of \$3,000 are available to support travel and accommodation expenses and a living allowance for students attending the Symposium, which is held at EMBL's headquarters in Heidelberg, Germany, in October or November each year.

The 2014 conference, 'Inspired by Biology—Exploring Nature's Toolbox', looked into the creative and multidisciplinary uses of existing biological mechanisms to solve problems in basic and applied sciences. The conference covered a range of fields from DNA nanorobots and xenonucleic acids to tissue engineering and biomaterials.

EMBL Australia supported 22 students (out of 29 applications) to attend the 16th EMBL PhD Symposium, which was held from 23 to 25 October 2014.



Left to right: Katherine Sanders, Nicholas Hunt and Ali McCorkindale at the 2014 EMBL PhD Symposium.

“I was able to meet many other students facing similar issues and challenges with their PhD, as well as keynote speakers who were able to help with some technical issues I was facing with my research project. I also learnt a lot about the different ways that molecular biology techniques can be used in varying fields of research, which was a valuable experience for me.”

Nilisha Fernando, ANU

“I have a few more ideas and experiments that I want to incorporate into my current research. Moreover, I think the trip helped me to clearly consider my interests and what I would like to work on after my PhD. I met a lot of like-minded PhD students. EMBL staff and students were very approachable and multicultural. I received feedback on my work which I value immensely. They also gave me advice on an academic career in the epigenetics field. I found them both very inspirational and supportive.”

Hilal Varinli, CSIRO

TRAVEL GRANTS TO THE 16TH EMBL PHD SYMPOSIUM

23–25 October 2014

Inspired by biology—Exploring nature’s toolbox, at EMBL Advanced Training Centre, EMBL Heidelberg

NUMBER OF APPLICATIONS



STATE UNIVERSITY/INSTITUTE

ACT	Australian National University
NSW	Victor Chang Cardiac Research Institute, Garvan Institute of Medical Research, University of New South Wales, University of Sydney, Bosch Institute, Children’s Cancer Institute, CSIRO
QLD	Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Institute for Molecular Bioscience (IMB), Bond University, QIMR Berghofer Medical Research Institute
SA	University of Adelaide
VIC	La Trobe University, Bio21 Molecular Science and Biotechnology Institute, The Walter and Eliza Hall Institute of Medical Research, Monash University, Monash Institute of Pharmaceutical Sciences, Deakin University
WA	The University of Western Australia

Funded



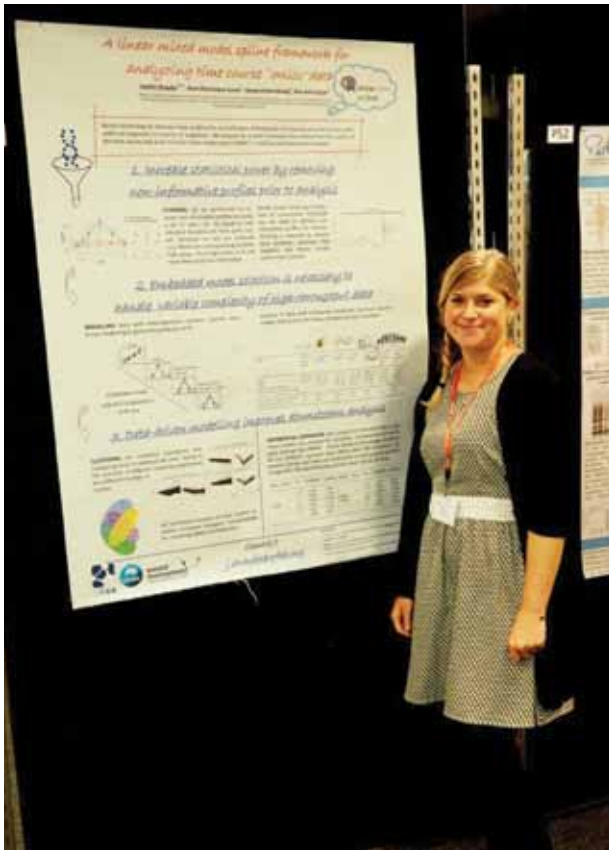
Students awarded short talks:

Rufika Shari Abidin (Australian Institute for Bioengineering and Nanotechnology, QLD)
Insert design and high-throughput screening to improve recovery of virus-like particle subunits for cytotoxic T cell epitope-based influenza vaccines

Nilisha Fernando (Australian National University, ACT)
The therapeutic potential of the complement inhibitor VCP in a model of retinal degeneration

Zhee Sheen Wong (The University of Queensland, QLD)
Oxidative stress correlates with *Wolbachia*-mediated antiviral protection in natural *Wolbachia*–*Drosophila* associations

Lara Bereza-Malcolm (La Trobe University, VIC)
Development of microbial biosensors for the detection of heavy metals



(Above) Jasmine Straube at her poster at the EMBL Australia PhD Symposium. (Below) Winners of the student presentation prizes, (L-R) Zoe Patterson Ross, Maria Kojic and Rina Soetanto. Credits: Katherine Sanders and Laura Baker



EMBL Australia PhD Symposium

Ninety PhD students from around Australia took part in EMBL Australia's first PhD Student Symposium held in December at the University of New South Wales.

The Symposium, organised by the students who attended EMBL Australia's first PhD Course in 2013, was inspired by the annual student-led symposium organised by first-year PhD candidates at EMBL's Heidelberg campus in Germany.

Invited international and local speakers included Andras Nagy (from Toronto, Canada), Ian Frazer, Nikola Bowden, Jose Polo, Marc Wilkins, James Chong and Jenny Stow.

With the theme 'Research in life sciences: from in vitro to in vivo', the inaugural symposium focused on the use of new technologies and techniques to conceptually and practically model disease.

During the conference, students also presented their research to their peers, through talks and posters.

Three prizes were awarded to the best oral presentations by students:

- First: Zoe Patterson Ross (University of Sydney) 'Influenza seasonality in Australia'
- Second: Maria Kojic (Institute of Molecular Bioscience, University of Queensland) 'Cerebellar ataxia and purkinje neuron loss in the wobbly mouse'
- Third: Rina Soetanto (John Curtin School of Medical Research, ANU) 'microRNA and microRNA processing variations in cardiac biology'

The 2015 EMBL Australia PhD Symposium will be held in Melbourne.

“It was fantastic and very inspirational to see so many talented young people—the next generation.”

Prof Andras Nagy, Canadian stem cell researcher



Scientific Head Nadia Rosenthal addresses the EMBL Australia PhD Symposium. Credit: Katherine Sanders and Laura Baker

“Contributing to the development of the inaugural EMBL Australia PhD Symposium was an incredible opportunity. We were overwhelmed by the quality of the invited plenary and student presenters. Events such as this symposium are fundamental in establishing networks of enthusiastic early-career scientists who will lead lifelong collaborations and further the scientific research capabilities of the next generation.”

Laura Baker, Garvan Institute PhD student and one of the organisers

Industry placements

The AMSI Industry Internship program is an Australian Mathematical Sciences Institute (AMSI) initiative supported by the Australian Bioinformatics Network, EMBL Australia, Bioplatforms Australia and CSIRO. The program places up to three postgraduate students into industry for short-term (four to five month) research projects to obtain valuable experience, with financial contributions from the industry partner.

In 2014 an internship was awarded to Monther Alhamdoosh, from La Trobe University. Monther completed his internship at CSL, on the topic ‘A comprehensive evaluation of pathway analysis tools.’ His supervisors at CSL were Drs Michael Wilson and Milica Ng, and he was mentored by Dr Matt Ritchie at the Walter and Eliza Hall Institute of Medical Research.

VISITORS AND ACTIVITIES

International visitors

In 2014–15 EMBL Australia and its partners hosted four international visitors.

- EMBL Hamburg scientist Dr Dmitri Svergun visited EMBL Australia in May 2014 as part of a visit to the Australian Synchrotron.
- Dr Vladimir Benes, Head of the Genomics Core Facility at EMBL Heidelberg, visited EMBL Australia and attended the EMBL Australia PhD Course as one of the speakers.
- Dr Patricia Wecker, from Centre de Recherches Insulaire et Observatoire de l'Environnement in French Polynesia, spent a month at SBI Australia learning systems biology techniques for analysis of coral stress laboratory data.
- Rochester University PhD student Thanh Van Tran joined SBI Australia as an East Asia and Pacific Summer Institute Fellow to work on a project with SBI Australia and MAXIMA at Monash University applying statistical techniques to develop and build model gene regulatory networks.

Activities

Over the year, EMBL Australia and its initiatives were involved in many activities that furthered the aims of the organisation.

May

EMBL Australia and the Australian Institute of Marine Science finalised a memorandum of understanding signed by AIMS CEO John Gunn and EMBL Australia. Planned collaborations include research in the areas of cellular and ecological networks and bioinformatics.

SAHMRI Group Leaders Ville-Petteri Mäkinen and David Lynn were formally inducted into EMBL Australia.

The Melbourne Brain Institute hosted a Victorian Systems Biology Collaborative, 'Future approaches to bone repair and modelling' with Dr Colin McHenry, Monash Department of Anatomy and Developmental Biology; Prof Justin Cooper-White, CSIRO, ARMI and the Australian Institute for Bioengineering and Nanotechnology; Prof Peter Pivonka, Australian Institute of Musculoskeletal Science and University of Melbourne; and Prof Melissa Knothe Tate, UNSW.

Prof Nadia Rosenthal was elected as a Fellow of the Academy of Medical Sciences in the UK for her outstanding contributions to advancing medical science.

June

The SBI Australia Cell Signalling workshop was held at CSIRO Clayton. The event, hosted by Dr Tim Adams and MAXIMA, featured Prof Roger Daly, Head of Monash University's Department of Biochemistry and Molecular Biology; Dr Melissa Davis, a Senior Cancer Research Fellow at the University of Melbourne; and Dr Tianhai Tian, from the School of Mathematical Sciences at Monash University.

The South Australian Health and Medical Research Institute, which hosts the South Australian node for EMBL Australia, held its scientific launch conference with sponsorship provided by EMBL Australia.

EMBL Australia opened expressions of interest for a new host institution for the Bioinformatics Resource.

SBI Australia and MAXIMA co-hosted a collaborative at Baker IDI on epidemiology modelling. Sixty-seven attendees joined Drs Jodie McVernon and James McCaw from the Melbourne School of Population and Global Health and Dr Joel Miller from Monash University's School of Mathematical Sciences to discuss mathematical methods applied to infectious diseases and epidemiology.

The 2014 EMBL Australia PhD Course commenced at the very end of June, with 60 students convening at the Australian National University for two weeks of seminars and workshops.

July

The Bioinformatics Resource and the Australian Bioinformatics Network sponsored the Winter School in Mathematical and Computational Biology, which was held at the University of Queensland.

The Australian Bioinformatics Network delivered a submission on the importance of bioinformatics to Australian science to the Senate Inquiry into Australia's Innovation Systems.

September

EMBL Australia briefed Robert Griew, Associate Secretary of Higher Education, Research and International, in the Commonwealth Department of Education, on EMBL Australia.

The Australian Bioinformatics Network supported the UCSC Genome Browser Roadshow, a series of seminars and workshops around Australia on the use of the UCSC Genome Browser.

The 15th International Conference on Systems Biology (ICSB 2014), hosted by EMBL Australia at the Melbourne Convention Centre, attracted more than 350 delegates from Australia and overseas. EMBL Australia and SBI Australia staff played a key role in organising the conference.

During ICSB 2014, SBI Australia held a special collaborative, 'Unlocking unique clinical research roadmaps using a systems biology approach', at the conference. Conference keynote speaker Prof Hiroaki Kitano was joined by Dr Jonathan Fitzgerald (VP, Discovery, Merrimack Pharmaceuticals) and Ms Maureen Turner (CEO, BioGrid Australia) to discuss the issues surrounding the use of systems biology in drug discovery.

EMBL Australia was one of 27 scientific organisations who exhibited at the National Collaborative Research Infrastructure Strategy (NCRIS) Showcase, in the Great Hall of Parliament House, Canberra (see box).

Showing Canberra what Australia's research infrastructure can do

Australia's research infrastructure is helping to improve economic productivity, health and wellbeing and drive industrial technologies, but the public and the politicians do not often get to see how this is all being achieved.

In September 2014, Canberra's politicians and the public got the chance to see exactly what Australia's major science infrastructure projects have been up to at the National Collaborative Research Infrastructure Strategy Showcase at Parliament House.

EMBL Australia was one of 27 exhibitors there to celebrate the achievements of NCRIS-supported research infrastructure over the past 10 years. NCRIS has invested more than \$2.5 billion into research infrastructure, with a further \$1 billion in co-investment coming from partners.

EMBL Australia's Scientific Head Nadia Rosenthal was at the showcase. "We're proud of what we have built so far with the funding we have received through NCRIS from the Australian Government," says Nadia. "And I'm thrilled that we're able to offer more infrastructural support to EMBL Australia research leader positions with the support of NCRIS."

"The showcase also really made me consider where we fit in Australia's broader research scene. With all the different types of research and data being produced from various infrastructure projects, it's exciting think about how they might be used collaboratively to solve problems."

October

The new ARC Centre of Excellence for Advanced Molecular Imaging was launched at Monash University. The Imaging Centre will host two EMBL Australia groups at Monash and two at UNSW's Centre for Single Molecule Science.

EMBL Australia Chair Richard Larkins gave a presentation on EMBL Australia to Universities Australia at the Queensland University of Technology in Brisbane. The universities agreed that EMBL Australia has been successful and that they would support the renewal of Australia's membership to EMBL.

EMBL Australia Group Leader Nicolas Plachta was one of three recipients of a Sylvia and Charles Viertel Charitable Foundation Senior Medical Research Fellowship, each worth \$1.225 million over five years.

The Australian Bioinformatics Network was a sponsor of the inaugural Australian Bioinformatics Conference (ABiC 2014), which was held at the Murdoch Childrens Research Centre in Melbourne.

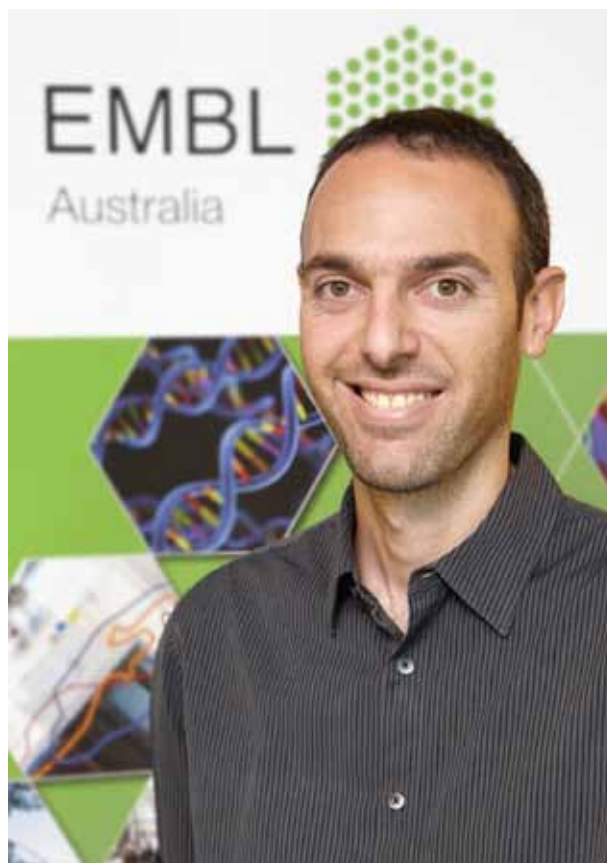
The Australian Bioinformatics and Computational Biology Society was launched by the Australian Bioinformatics Network at ABiC 2014.

Twenty-two Australian PhD students travelled to Heidelberg, Germany, to attend the annual EMBL PhD Symposium.

November

SBI Australia held a Victorian Systems Biology Collaborative event at Monash University. 'News from the Heart—a Cardiac Health Collaborative' featured ARMI scientists Dr Milena Furtado and Dr Mirana Ramialison, and Dr Vijay Rajagopal from the University of Melbourne's Department of Electrical and Electronic Engineering.

EMBL Australia Group Leader Nicolas Plachta was a finalist for the 2014 Centenary Institute Lawrence Creative Prize.



Group Leader Nicolas Plachta. Credit: David Russell

December

The Australian Mathematical Sciences Institute held its annual summer school in bioinformatics (BioInfoSummer), which was sponsored by EMBL Australia and the Australian Bioinformatics Network.

AUSTRALIA-EMBL INTERACTIONS

PERSONNEL/EXPERTISE EXCHANGE

60

EMBL ALUMNI
RESIDING/WORKING
IN AUSTRALIA

11 AUSTRALIANS
WERE WORKING AT
EMBL IN 2014



2014

ACCESS TO WORLD CLASS RESEARCH INFRASTRUCTURE AND SERVICES

IN 2014
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

102

SCIENTISTS FROM AUSTRALIA
ATTENDED COURSES
AND CONFERENCES IN 2014

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

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

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



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 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.

Life sciences newsletter

Nadia Rosenthal, Scientific Head of EMBL Australia, sends a well-received monthly newsletter to stakeholders with information on EMBL Australia activities and other useful life sciences information. This newsletter consistently gets over 40% of recipients opening the bulletins, an increase from an average of 36% last year.

Newsletter reach

- There are 1434 newsletter subscribers (to Feb 2015).

JAN 2013

972

JAN 2014

1248

DEC 2014

1434

- On average, 44% of recipients opened the newsletter.

Average newsletter statistics, March to February

2014–15

1377 NEWSLETTER RECIPIENTS



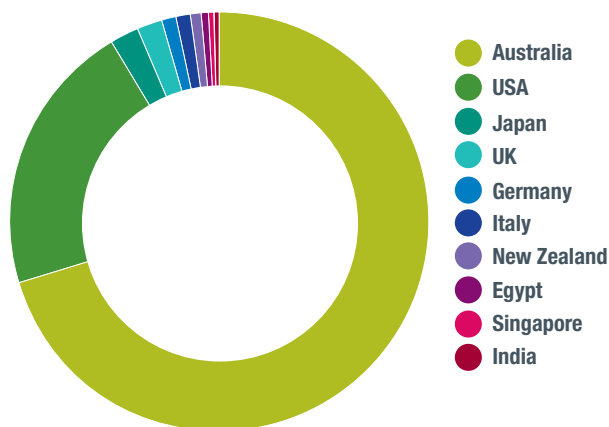
2013–14

1152 NEWSLETTER RECIPIENTS



- The most popular story links this year were the advertisements for jobs with EMBL Australia, PhD travel grants and the link to join the new bioinformatics society.
- Newsletter readers are mostly in Australia and the US, but come from 17 countries.

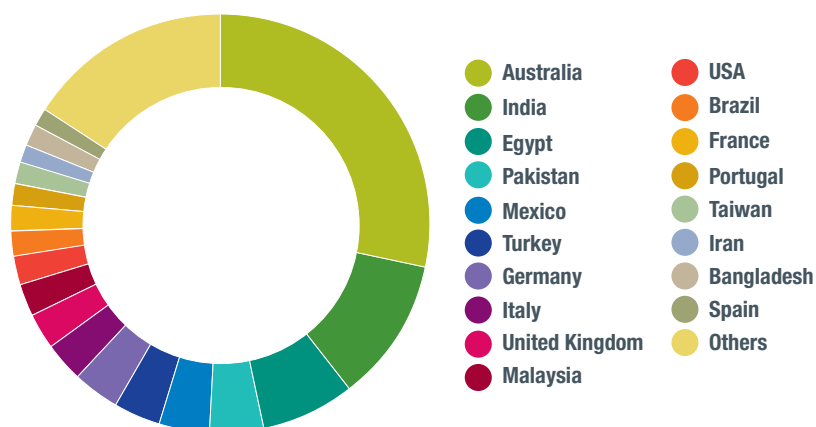
Newsletter opens



Social media

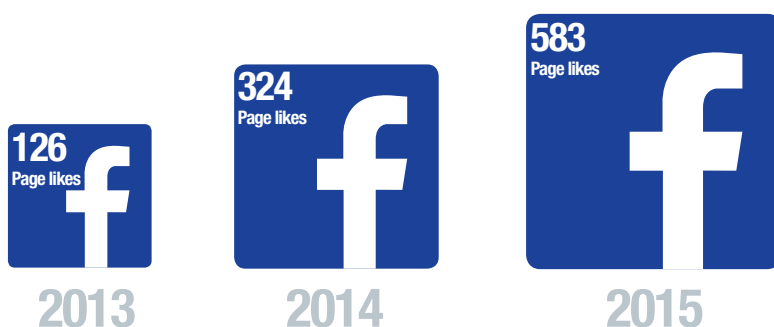
EMBL Australia shares news and activities and other information of interest to the life sciences community on social media. Partners, including EMBL, EMBL–EBI, Monash University, SAHMRI and others, share our news via their social media platforms, helping us reach a wider audience. EMBL Australia is now connected with similar organisations, peak medical research bodies, our European partner organisations, research and business leaders, science journalists and many other researchers.

Facebook page “likes”



Facebook

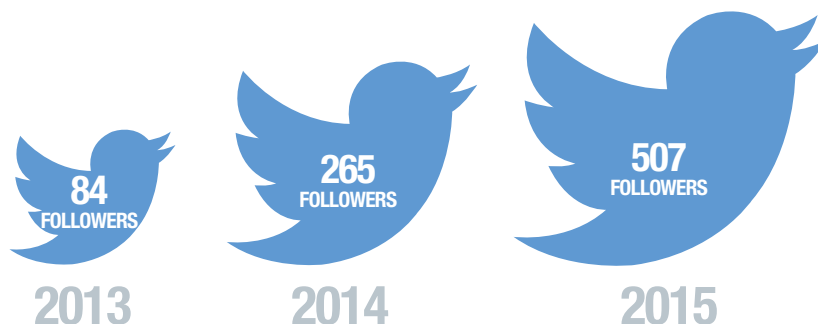
- 583 people ‘like’ the EMBL Australia Facebook page (<https://www.facebook.com/EMBLAustralia>).



FACEBOOK FOLLOWERS MOSTLY COME FROM AUSTRALIA (28%), BUT ALSO FROM ANOTHER 45 COUNTRIES FROM ALL PARTS OF THE WORLD.

Twitter @EMBLAustralia

- EMBL Australia has tweeted throughout the year; mostly news items but also interactions with others regarding conferences, EMBL Australia’s student programs and other opportunities for researchers.



THE TWITTER FOLLOWING ALMOST DOUBLED TO REACH 507 FOLLOWERS.

- EMBL Australia is followed by a large group of individual scientists who actively engage with our content.
- Good Twitter relationships have been established with partner organisations and others in the research space, including:
 - ARMI @ARMI_Labs (341 followers at end of February 2015)
 - Association of Australian Medical Research Institutes @AAMRI_Aus (1000)
 - EMBL @EMBLorg (1870)
 - EMBL-EBI @EMBLEbi (11,900)
 - EMBO events @EMBOevents (856)
 - SAHMRI @SAHMRI_Tweets (1310)
 - Single Molecule Science at UNSW @SingMolSci (39)
 - Stem Cell Foundation @AusStemCell (4301)
 - Stem Cells Australia @StemCellsAus (1291).

These channels extend the reach of our posts, helping EMBL Australia become known to the right audience.



EMBL students on social media

Facebook and Twitter are proving to be useful networking platforms for EMBL Australia's students. Attendees at student conferences and workshops have set up closed Facebook groups, which provide a community of peers:

- EMBL Australia 2013 PhD Course
- EMBL Australia 2014 PhD Course
- EMBL Australia 2014 PhD Symposium
- EMBL Australia Protein Masterclass.

The students also set up a website (emblphdsymposium.org.au) and Twitter account (@EMBLAuSymposium) for the EMBL Australia PhD Student Symposium.

The EMBL Australia 2015 PhD Symposium has a Facebook page—unlike the closed student groups, this page is open to all Facebook users.

EMBL Australia in the news

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

- The Currie Group's research in *Nature* on how haematopoietic stem cells, which are used in bone marrow transplants, are formed was covered in print and on radio (14 August 2014)

The image shows a screenshot of a news article from the Herald Sun website. The article is titled "Holy grail of making stem cells in laboratory a step closer after discovery using zebra fish at Monash University". The author is Lucie Van Den Berg, a medical reporter, and the article was published on August 14, 2014, at 3:00 AM. The article features a photograph of Professor Peter Currie and Dr Phong Dang Nguyen inspecting zebra fish in a laboratory. The text of the article discusses the discovery of how stem cells used in bone marrow transplants are produced, bringing the "holy grail" of making the cells in the lab a step closer. The article also mentions that the research involved filming zebra fish, which have see-through embryos, so scientists could watch the developmental changes.

[http://www.heraldsun.com.au/news/victoria/holy-grail-of-making-stem-cells-in-laboratory-a-step-closer-after-discovery-using-zebra-fish-at-monash-university/story-fni0ft3-1227023457606;](http://www.heraldsun.com.au/news/victoria/holy-grail-of-making-stem-cells-in-laboratory-a-step-closer-after-discovery-using-zebra-fish-at-monash-university/story-fni0ft3-1227023457606)

- The new EMBL node at the UNSW Centre in Single Molecule Science was reported in *Life Scientist* (20 August 2014)

LifeScientist

Biotechnology Health & medical Life sciences Molecular biology

SUBSCRIBE The Magazine Event Calendar AusBiotech AppNotes

New EMBL Australia node

By Life Scientist Staff | Posted in Proteins on 20 August, 2014

Share 0 | Share 0 | Tweet 0 | Pin it 0 | +1 0

The European Molecular Biology Laboratory (EMBL) has created a partnership with the University of New South Wales (UNSW) to set up a new **EMBL Australia** node at UNSW's Lowy Cancer Research Centre.

The new node, the UNSW Centre in Single Molecule Science, will focus on the molecular perspectives of complex biological systems and will encompass biophysics, biochemistry, cell biology as well as nanotechnology and nanofabrication.

Two new group leaders will be recruited to the centre over the next 6-12 months. The group leader positions offer stability with five years of funding and the option of extending for a further four years.

The centre forms part of UNSW's Single Molecule Science Initiative, which is underpinned by new imaging and analysis technologies being developed by Professor Katharina Gaus, group leader at the Centre for Vascular Research at the Lowy Cancer Research Centre and deputy director of the ARC Centre of Excellence in Advanced Molecular Imaging.

"Through this centre, UNSW will join SAHMRI and Monash University in giving outstanding early-career scientists recruited from around the world the opportunity to focus on their research programs here in Australia without funding worries," said Nadia Rosenthal, EMBL Australia's scientific head.

<http://www.lifescientist.com.au/content/molecular-biology/news/new-embl-australia-node-658738025>

- Thomas Preiss featured in a report in *The Australian* on progress, and setbacks, in stem cell science in 2014 and his participation in a prominent international stem cell consortium (3 January 2015)

THE AUSTRALIAN LOGIN SIGN UP plus

NEWS OPINION BUSINESS REVIEW NATIONAL AFFAIRS SPORT LIFE TECHNOLOGY ARTS

One step back, 10 steps forward for stem cells

THE AUSTRALIAN | JANUARY 03, 2015 12:00AM

John Ross
Higher Education Reporter
Sydney

Follow @JohnRoss4

ANU's Thomas Preiss, who worked on Project Grandiose. Picture: Ray Strange Source: News Corp Australia

IN case you missed it, 2014 was the year stem-cell research jumped to warp speed. Already a fast-paced discipline, the action began in January when a team of Japanese scientists claimed to have found an almost unbelievably simple way of producing embryonic stem cells. In October, incredible news broke that stem cells from a paraplegic's nose had enabled him to walk again. And in December it was announced that an extraordinary collaboration involving 50 scientists from around the world — 15 of them Australian — had resulted in a highly detailed road map for how to reprogram cells.

Although one of these breakthroughs foundered, ending in tragedy and disgrace for the scientists involved, the sheer quality and quantity of stem cell research around the world last year made 2014 a game-changer for the field.

<http://www.theaustralian.com.au/news/features/one-step-back-10-steps-forward-for-stem-cells/story-e6frg6z6-1227173040205>

- In an article in *The Australian*, Peter Currie responded to concerns about the credibility of stem cell research following the retraction of a study published in *Nature* that reported a simple way of creating embryonic stem cells (19 August 2014)



<http://www.theaustralian.com.au/higher-education/science-can-keep-its-house-in-order/story-e6frgcjx-1227028449507>

- Monash University reported Nadia Rosenthal's election to the Academy of Medical Sciences in the UK (13 May 2014)



<http://monash.edu/news/show/leader-in-regenerative-medicine-honoured-by-academy-of-medical-sciences>

- Nicolas Plachta's Sylvia and Charles Viertel Fellowship was reported in *The Australian* and by Monash University

Prestigious fellowship for regenerative medicine researcher

12 November 2014

A Monash researcher's work to understand how embryos form has been commended with a prestigious fellowship.

Dr Nicolas Plachta from EMBL Australia and the Australian Regenerative Medicine Institute (ARMI) at Monash University is one of just three researchers in Australia to be recognised by the Sylvia and Charles Viertel Charitable Foundation this year.

The foundation's Senior Medical Research Fellowships acknowledge outstanding researchers who are medically qualified or graduates of another scientific discipline, with recognised postdoctoral achievements seeking to establish a research career in Australia and undertake research in an Australian academic institution.

Dr Nicolas Plachta

<http://monash.edu/news/show/prestigious-fellowship-for-regenerative-medicine-researcher>

Sponsorship of events

EMBL Australia and its initiatives were proud to sponsor a range of external activities, including:

- The Australian Bioinformatics Network supported the highly successful Australian Bioinformatics Conference run as a satellite meeting of the 2014 conference of the Australasian Genomic Technologies Association (AGTA 2014).
- The Australian Bioinformatics Network supported the UCSC Genome Browser Roadshow, a series of seminars and workshops around Australia on the use of the UCSC Genome Browser, in September 2014.
- The Bioinformatics Resource and the Australian Bioinformatics Network sponsored the Winter School in Mathematical and Computational Biology, which was held at the University of Queensland in July 2014.
- EMBL Australia and the Australian Bioinformatics Network sponsored the Australian Mathematical Sciences Institute annual summer school in bioinformatics (BioInfoSummer).
- EMBL Australia sponsored the scientific launch conference of SAHMRI, which hosts the South Australian node for EMBL Australia.



PROFESSIONAL ACTIVITIES

Active grants

Name	Grant
Nadia Rosenthal	British Heart Foundation: Research Excellence Award (2008–14)
	EU Seventh Framework Programme (FP7) ENDOSTEM: Vasculature associated stem cells and muscle stem cells (2010–14)
	EU FP7 EUCOMMTOOLS: Tools for functional annotation of the mouse genome (2010–15)
	NHMRC Australian Fellowship: Enhancing human regeneration: a systems approach (2010–16)
	ARC Special Research Initiative: Stem Cells Australia (University of Melbourne): Internal share (2011–18)
	Cardionet (FP7 EU Marie Curie Initial Training Network) (2012–15)
	National Heart Foundation: Macrophage-mediated therapy of myocardial injury (2013–14)
	NHMRC: Equipment grant (2014)
	Mesoblast: Novel mechanisms of MPC action through physical organelle transfer (2013–16)
	British Heart Foundation Cardiovascular Regenerative Medicine Centre (2013–17)
	Fondation Leducq Transatlantic Networks of Excellence (2013–18)
	NHMRC Project Grant: Congenital heart disease and cardiac stress (2014–17)
	UK Regenerative Medicine Platform Immunomodulation Hub (2014–19)
	NHMRC Project Grant Multi Institutional Agreement: Using Nkx2-5 knock-in mouse models to understand complex cardiac diseases (2014–16)
	NHMRC Project Grant: The C-type lectin Mincle exemplifies a new mode of sterile inflammation in cardiovascular disease (2013–16)
ARC Linkage Grant Special Research Initiative, Strategic fund (shared collaborative): Microfluidic platforms for assessing cell–cell interactions in tissue (2014)	
Peter Currie	ARC Discovery Early Career Researcher Award (to Patricia Jusuf): Role of intrinsic versus extrinsic cues in cell type determination during development and regeneration (2012–14)
	Muscular Dystrophy Association US: Small molecule screening in a zebrafish model of Duchenne muscular dystrophy (2011–14)
	NHMRC Principal Research Fellowship: Genetic basis for skeletal muscle formation in development and disease (2013–16)
	NHMRC Project Grant: Evaluation and design of therapeutic strategies utilising zebrafish genetic models of Duchenne Muscular Dystrophy (2013–14)
	NHMRC Project Grant: Modelling laminin mediated adhesion and congenital muscular dystrophy in zebrafish (2013–15)
	NHMRC Project Grant: Molecular mechanisms that generate and activate muscle stem cells during growth and disease (2013–15)
	NHMRC Project Grant: The role of scube gene function in hedgehog signal transduction (2012–14)
	Sigma–Aldrich Pty Limited: Generating a targeted mutation resource in zebrafish (2012–15)

Active grants

Name	Grant
Edwina McGlenn	NHMRC Project Grant: Elucidating the role of miR-196 in formation of the axial skeleton (2013–16)
	NHMRC Project Grant: Redefining proprioceptive circuitry at a molecular level (2014–16)
Nicolas Plachta	Viertel Charitable Foundation Senior Medical Research Fellowship (Australia) (2015–19)
	NHMRC Career Development Fellowship: Seeing how mammalian life starts—quantitative single-cell imaging of living embryos (2015–18)
	NHMRC Project Grant: Revealing how the mammalian preimplantation embryo undergoes compaction (2014–16)
	NHMRC Project Grant: Revealing how transcription factors search the DNA to control preimplantation development in mammals (2013–15)
	ARC Discovery Project: Imaging transcription factors in living mammalian embryos to reveal cell-to-cell variability (2012–14)
	ARC Discovery Early Career Researcher Award: Revealing dynamic mechanisms controlling pluripotency in mammalian stem cells and embryos (2012–14)
	Deutsche Forschungsgemeinschaft (German Research Foundation) Fellowship (awarded to postdoctoral researcher Jennifer Zenker, 2014)
Marcus Heisler	European Research Council Starting Grant: The establishment and function of dorsiventral boundaries in plant organs (2011–15)
David Lynn	The Garnett Passe and Rodney Williams Memorial Foundation Project Grant: Blood serum microRNA biomarkers for detection of oropharyngeal cancer (2015–17)
	Australian Hotels Association (South Australia), Hotel Care Community Projects: Funding for High Performance Computing Infrastructure for Bioinformatics at SAHMRI (2014–16)
	European Commission Seventh Framework Programme–HEALTH grant: PRIMES—Protein interaction machines in oncogenic EGF receptor signalling (2011–16)
	National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs), UK, CRACK IT Challenge 16. Virtual Infectious Disease Research. Phase I award: Modelling of the molecular interactions between host and pathogen (2014)
Sarah Boyd	Great Barrier Reef Foundation: The resilient reefs successfully adapting to climate change program (2013–14)
Sarah Boyd and Silvio Tiziani	Victorian Department of Economic Development, Jobs, Transport and Resources: Enhancing Systems Biology in Victoria (2013–15)
Sarah Boyd and Hiroaki Kitano	ARC Discovery Project: Systems modelling of the cardiac fibroblast (2013–15)
Hieu Nim and Sarah Boyd	Richard Pratt Fellowship in Prostate Cancer 2014
James Bourne	European Research Council Advanced Grant (Seventh Framework Programme): Functional wiring of the core neural network of innate fear: Mapping connectivity of the primate innate fear network (2014–19)
Thomas Preiss	NHMRC project grant: Charting the interface between cellular metabolic states and gene regulation (2013–15)

Publications

Note: for the 2014 calendar year.

1. **Berger, J., H. Tarakci, S. Berger, M. Li, T.E. Hall, A. Arner & P.D. Currie**, *Loss of Tropomodulin4 in the zebrafish mutant trage causes cytoplasmic rod formation and muscle weakness reminiscent of nemaline myopathy*. *Dis Model Mech*, 2014. **7**(12): 1407-1415. **IF: 5.537** Ranking:44/185
2. Bilbao, D., L. Luciani, B. Johannesson, A. Piszczek & **N. Rosenthal**, *Insulin-like growth factor-1 stimulates regulatory T cells and suppresses autoimmune disease*. *EMBO Mol Med*, 2014. **6**(11):1423-1435. **IF: 8.245** Ranking 8/124
3. Carnevali, L., G. Graiani, S. Rossi, M. Al Banchaabouchi, E. Macchi, F. Quaini, **N. Rosenthal** & A. Sgoifo, *Signs of cardiac autonomic imbalance and proarrhythmic remodeling in FTO deficient mice*. *PLoS One*, 2014. **9**(4):e95499. 1-10. **Impact Factor: 3.534** Ranking 8/55
4. Forbes, S.J. & **N. Rosenthal**, *Preparing the ground for tissue regeneration: from mechanism to therapy*. *Nat Med*, 2014. **20**(8):857-869. **IF: 28.054** Ranking: 2/291
5. **Furtado, M.B., M.W. Costa, E.A. Pranoto, E. Salimova, A.R. Pinto, N.T. Lam, A. Park, P. Snider, A. Chandran, R.P. Harvey, R. Boyd, S.J. Conway, J. Pearson, D.M. Kaye & N.A. Rosenthal**, *Cardiogenic genes expressed in cardiac fibroblasts contribute to heart development and repair*. *Circ Res*, 2014. **114**(9):1422-34. **Impact Factor : 11.089** Ranking 4/125
6. **Furtado, M.B., H.T. Nim, J.A. Gould, M.W. Costa, N. Rosenthal & S.E. Boyd**, *Microarray profiling to analyse adult cardiac fibroblast identity*. *Genomics Data*, 2014. **2**:345-350.
7. **Godwin, J.**, *The promise of perfect adult tissue repair and regeneration in mammals: Learning from regenerative amphibians and fish*. *Bioessays*, 2014. **36**(9):861-871. **IF:4.927** Ranking 57/291
8. **Godwin, J., D. Kuraitis & N. Rosenthal**, *Extracellular matrix considerations for scar-free repair and regeneration: insights from regenerative diversity among vertebrates*. *Int J Biochem Cell Biol*, 2014. **56**:47-55. **IF: 4.240** Ranking: 75/291
9. **Godwin, J.W. & N. Rosenthal**, *Scar-free wound healing and regeneration in amphibians: immunological influences on regenerative success*. *Differentiation*, 2014. **87**(1-2): p. 66-75. **Impact Factor: 2.836** Ranking: 17/41
10. **Goldshmit, Y., F. Frisca, A.R. Pinto, A. Pebay, J.K. Tang, A.L. Siegel, J. Kaslin & P.D. Currie**, *Fgf2 improves functional recovery-decreasing gliosis and increasing radial glia and neural progenitor cells after spinal cord injury*. *Brain Behav*, 2014. **4**(2):187-200.
11. **Goldshmit, Y., J. Homman-Ludiye & J.A. Bourne**, *EphA4 is associated with multiple cell types in the marmoset primary visual cortex throughout the lifespan*. *Eur J Neurosci*, 2014. **39**(9):1419-1428. **Impact Factor:3.669** Ranking: 85/251
12. **Goldshmit, Y., S.S. Trangle, Y. Kloog & R. Pinkas-Kramarski**, *Interfering with the interaction between ErbB1, nucleolin and Ras as a potential treatment for glioblastoma*. *Oncotarget*, 2014. **5**(18):8602-8613. **IF: 6.627** Ranking: 35/185
13. **Heisler, M.G. & C. Ohno**, *Live-imaging of the Arabidopsis inflorescence meristem*. *Methods Mol Biol*, 2014. **1110**:431-40.
14. Johannesson, B., S. Sattler, E. Semenova, S. Pastore, T.M. Kennedy-Lydon, R.D. Sampson, M.D. Schneider, **N. Rosenthal** & D. Bilbao, *Insulin-like growth factor-1 induces regulatory T cell-mediated suppression of allergic contact dermatitis in mice*. *Dis Model Mech*, 2014. **7**(8):977-985. **IF: 5.537** Ranking: 44/185
15. **Mäkinen, V-P., M. Civelek, Q. Meng, B. Zhang, J. Zhu, et al.**, *Integrative Genomics Reveals Novel Molecular Pathways and Gene Networks for Coronary Artery Disease*. *PLoS Genet*, 2014. **10**(7): e1004502.
16. **Masselink, W., J.C. Wong, B. Liu, J. Fu & P.D. Currie**, *Low-cost silicone imaging casts for zebrafish embryos and larvae*. *Zebrafish*, 2014. **11**(1):26-31. **Impact Factor: 1.772** Ranking :35/152
17. Molawi, K., Y. Wolf, P.K. Kandalla, J. Favret, N. Hagemeyer, K. Frenzel, **A.R. Pinto, K. Klapproth, S. Henri, B. Malissen, H.R. Rodewald, N.A. Rosenthal, M. Bajenoff, M. Prinz, S. Jung & M.H. Sieweke**, *Progressive replacement of embryo-derived cardiac macrophages with age*. *J Exp Med*, 2014. **211**(11):2151-2158. **IF: 13.912** Ranking 5/144

18. **Nguyen, P.D.**, G.E. Hollway, **C. Sonntag, L.B. Miles**, T.E. Hall, **S. Berger**, K.J. Fernandez, D.B. Gurevich, N.J. Cole, S. Alaei, **M. Ramialison**, R.L. Sutherland, J.M. Polo, G.J. Lieschke & **P.D. Currie**, *Haematopoietic stem cell induction by somite-derived endothelial cells controlled by meox1*. *Nature*, 2014. **E pub**:1-18. **Impact Factor: 42.351** Ranking: 1/55
19. **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*, 2014. **117**(1):69-77
20. **Pinto, A.R., J.W. Godwin & N.A. Rosenthal**, *Macrophages in cardiac homeostasis, injury responses and progenitor cell mobilisation*. *Stem Cell Res*, 2014. **13**(3 Pt B):705-714. **IF 3.912** Ranking: 31/165
21. **Pinto, A.R., J.W. Godwin, A. Chandran, L. Hersey, A. Ilinykh, R. Debuque, L. Wang & N.A. Rosenthal**, *Age-related changes in tissue macrophages precede cardiac functional impairment*. *Aging (Albany NY)*, 2014. **6**(5):399-413. **IF: 4.886** Ranking 53/185
22. **Reibe-Pal, S.** & B. Madea, *Calculating time since death in a mock crime case comparing a new computational method (ExLAC) with the ADH method*. *Forensic Sci Int*, 2014. **248**:78-81
23. **Rosenthal, N.** & M.D. Grounds, *EDITORIAL: Regenerative Medicine: The Challenge of Translation*. *The International Journal of Biochemistry & Cell Biology*, 2014. **56**:2-3. **IF: 4.240** Ranking 75/291
24. **Rosenthal, N.** & M. Zernicka-Goetz, *EDITORIAL: A tribute to Sir John Gurdon*. *Differentiation*, 2014. **88**(1):1-2. **IF: 2.836** Ranking 17/41
25. Uribe, V., C. Badia-Careaga, **J.C. Casanova**, J.N. Dominguez, J.L. de la Pompa & J.J. Sanz-Ezquerro, *Arid3b is essential for second heart field cell deployment and heart patterning*. *Development*, 2014. **141**(21):4168-4181. **IF:6.273** Ranking: 4/41
26. **White, M. & N. Plachta**, *The first cell fate decision during mammalian development*. In *Stem Cells, Tissue Engineering & Regenerative Medicine*. Imperial College Press, 2014.

Invited conference and seminar presentations

Name	Presentation
Sarah Boyd	CSIRO eResearch Conference, Bioinformatics FOAM (Focus On Analytical Methods), 28 March 2014, Melbourne, Invited speaker
	Forum on International Links: Global Postgraduate and Research Collaboration, 5 November 2014, University of Queensland, Brisbane, Invited speaker
Peter Currie	Guys Hospital, Kings College London, UK, 24 June 2014, Invited speaker
	6th Asia Oceania Zebrafish Meeting, Hong Kong, China, 19–22 January 2014, Invited speaker
	7th International Zebrafish Disease Models Conference, Madison, Wisconsin, USA, 28 June – 1 July 2014, Invited speaker
	38th Annual Scientific Meeting of the Matrix Biology Society of Australia and New Zealand (MBSANZ) Queenscliff, Victoria, 26–29 October 2014, Keynote speaker
David Lynn	International PRIMES Consortium Meeting, Vienna, Austria, 1–3 December 2014, Invited speaker
	Ophthalmology Seminar Series, Flinders Medical Centre, Adelaide, South Australia, 19 August 2014, Invited speaker
	Career Talk at School of Molecular and Biomedical Sciences Postgraduate Symposium, University of Adelaide, South Australia, 24 July 2014, Invited speaker
	SAHMRI Seminar Series, SAHMRI, Adelaide, South Australia, 11 July 2014, Invited speaker
Ville-Petteri Mäkinen	SAHMRI Heart Health Seminar, 8 August 2014, Adelaide, South Australia, Invited speaker
	SAHMRI Scientific Seminar, 12 September 2014, Adelaide, South Australia, Invited speaker
	Centenary Institute Seminar, 19 August 2014, Sydney, New South Wales, Invited speaker
	SA Pathology Bioinformatics Seminar, 26 September 2014, Adelaide, South Australia, Invited speaker
	Biomedicum Diabetes Seminar, Folkhalsan Research Center, 15 August 2014, Helsinki, Finland, Invited speaker
	ComBio2014, 1 Oct 2014, Canberra, Australia, Invited speaker
	Sydney Bioinformatics Research Symposium, 7 Nov 2014, Sydney, New South Wales, Invited speaker
Edwina McGlenn	St Vincent's Institute, Melbourne, 3 June 2014, Invited speaker
Nicolas Plachta	The Biological Optical Microscopy Platform Annual Symposium, 12 September 2014, University of Melbourne, Victoria, Plenary speaker
	2014 International Biophysics Congress, Brisbane Convention & Exhibition Centre, Brisbane, Qld, 3–7 August 2014, Invited speaker
Nadia Rosenthal	Systems Biology Course, Innsbruck, Austria, 2–8 March 2014, Instructor
	Stem Cell Conference, Lugano, Switzerland, 23–24 June 2014, Plenary speaker
	Stem Cells Australia meeting, 9–10 April 2014, Plenary speaker
	8th Symposium on Biologic Scaffolds for Regenerative Medicine, Napa Valley, California, USA 26–28 April 2014, Plenary speaker
	World Congress of Cardiology, Melbourne, 4–7 May 2014, Keynote speaker
	Science/Science Translational Medicine Stem cell Symposium, Beijing, China, October 2014, Plenary speaker
	American Heart Association Conference, Chicago, Illinois, USA, November 15–19 2014, Plenary speaker
15th International Conference on Systems Biology, Melbourne, 14–18 September 2014, Opening and closing speaker	

Advisory boards and committees

Name	Organisation	Board/Committee	Role	Since
Peter Currie	Global Facioscapulohumeral Muscular Dystrophy Association	Scientific Advisory Board	Member	2008
	Human Frontiers Science	Fellowship Review Panel	Member	2005
	International Steering committee on zebrafish research	Committee	Member	2007
	Australian Academy of Science	National Committee of Cell Developmental Biology	Committee member	2013
	International Zebrafish Society		Committee member	2014
Nadia Rosenthal	International Mouse Mutagenesis Consortium	Consortium	Member	2002
	Institute of Advanced Studies, University of Western Australia	Scientific Advisory Board	Member	2005
	Descartes Prize	Grand Jury	Member	2005
	Keystone Symposia	Scientific Advisory Board	Member	2005
	Koeber Prize	Grand Jury	Member	2006
	Center for Molecular Medicine, Vienna	Scientific Advisory Board	Member	2007
	Institute of Molecular Biology and Biotechnology, Heraklion, Crete	Scientific Advisory Board	Member	2008
	European Research Council	Grant Review Committee	Chair	2010
	College of the Atlantic, US	Board of Trustees	Member	2011
	SENS Foundation	Research Advisory Board	Member	2011
	Max Planck Institute, Bad Neuheim	Scientific Advisory Board	Member	2012
	The Jackson Laboratory, US	Scientific Research Council	Member	2013
	Mount Desert Island Biological Laboratories, US	Scientific Advisory Board	Member	2013
	Monash–Warwick Systems Biology Workshop, Venice	Organising Panel	Co-organiser	2013

Journal editorial roles

Name	Publication	Role	Since
Peter Currie	Development	Editorial Board	2006
	Developmental Biology	Editorial Board	2011
Nadia Rosenthal	Developmental Biology	Editorial Board	1995
	BioMedNet (mouse models of diseases reviews)	Guest Editor	2001
	Developmental Dynamics	Editorial Board	2003
	Rejuvenation Research	Editorial Board	2004
	Disease Models and Mechanisms	Founding Editor	2007
	Stem Cell Research and Therapy	Editorial Board	2010
	Differentiation	Editor-in-Chief	2012
	Regenerative Medicine Research	Editorial Board	2012
	Regeneration	Founding Editor	2013
	International Journal of Biochemistry and Cell Biology	Guest Editor	2014

Conference organising committees

Name	Conference	Role
Sarah Boyd	International Conference on Systems Biology (ICSB 2014), 14–18 September 2014, Melbourne	Co-organiser
Edwina McGlenn	7th Australian Developmental Biology Workshop, 12–15 Nov 2014, Tangalooma Island Resort, Moreton Island, Queensland	Co-organiser
Nadia Rosenthal	International Conference on Systems Biology (ICSB 2014), 14–18 September 2014, Melbourne	Co-organiser
Silvio Tiziani	International Conference on Systems Biology (ICSB 2014), 14–18 September 2014, Melbourne	Co-organiser

Memberships of professional societies

Name	Society	Since
Peter Currie	Society for Muscle Biology	2002
	Australia and New Zealand Society for Cell and Developmental Biology	2003
	Health Research Council of New Zealand College of Experts	2012
David Lynn	Australian Bioinformatics and Computational Biology Society	2014
Ville-Petteri Mäkinen	European Association for the Study of Diabetes	2010
	European Diabetic Nephropathy Study Group	2006
Edwina McGlinn	Australia and New Zealand Society for Cell and Developmental Biology	2012
Nadia Rosenthal	American Society for Biochemistry and Molecular Biology	1988
	American Society for Cell Biology	1992
	Society for Developmental Biology	1994
	Australia and New Zealand Society for Cell and Developmental Biology	2001
	International Society of Differentiation	2002
	European Molecular Biology Organization	2002

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

- ANU held the 2014 EMBL Australia PhD Course in July 2014.
- 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.

Bioplatforms Australia

- Bioplatforms Australia offers subsidised services to EMBL Australia group leaders.
- Bioplatforms Australia, CSIRO and EMBL Australia have jointly established the Australian Bioinformatics Network.
- EMBL Australia and Bioplatforms Australia are jointly funding the AMSI Intern program.
- The Bioinformatics Resource is working with Bioplatforms Australia to build systems to manage and share coral reef genome data generated by the Sea-quence project, which is also supported by Rio Tinto and the ReFuGe 2020 consortium (which includes the Great Barrier Reef Foundation, James Cook University, AIMS, UQ, the Great Barrier Reef Marine Park Authority, the King Abdullah University of Science and Technology (Saudi Arabia) and the ANU).

Systems Biology Institute (Japan)

- SBI has established its first international node, SBI Australia, in collaboration with EMBL Australia.
- Additional collaborations with SBI include the Monash IVF project and the collaboration with the Australian Institute of Marine Science.

GOVERNANCE

EMBL Australia participants

EMBL Australia is an unincorporated joint venture between the Group of Eight universities (Australian National University, 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) and CSIRO, with the support of the Department of Education and the Department of Industry.

Ensuring EMBL Australia's future

In late 2014, the Australian Government and EMBL Council agreed to extend Australia's associate membership of EMBL to June 2015, and beyond if funding for the membership is secured.

EMBL Australia Council

The EMBL Australia Council has continued to review and develop the EMBL Australia governance model and guidelines for establishment of new groups and nodes.

The Council includes up to two representatives from each participating institution as well as a number of independent scientist members.

Chair

Prof Richard Larkins, AO

Australian National University

Prof Andrew Cockburn, Director of the ANU College of Medicine, Biology & Environment (until April 2014)

Prof Chris Goodnow, Head of the Department of Immunology

Prof Kieran Kirk, Dean of the College of Medicine, Biology & Environment, ANU College of Medicine, Biology and Environment and ANU College of Physical & Mathematical Sciences (from April 2014)

CSIRO

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

EMBL

Prof Iain Mattaj, Director General

Dr Silke Schumacher, Director of International Relations

EMBL Australia

Prof Nadia Rosenthal, Scientific Head of EMBL Australia

Mr Silvio Tiziani, Executive Director of EMBL Australia

Monash University

Prof Edwina Cornish, Provost and Senior Vice-President

Prof Ross Coppel, Deputy Dean and Director of Research of the 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 of the Department of Biochemistry and Molecular Biology

The University of New South Wales

Prof Merlin Crossley, Dean of Science

Prof Warwick Dawson, Director of Research Partnerships (until Nov 2014)

Prof Peter Gunning, Deputy Dean, School of Medical Sciences (from Nov 2014)

The University of Queensland

Prof Anton Middelberg, Acting Deputy Vice-Chancellor (Research) (until Sep 2014)

Prof Brandon Wainwright, Director of the Institute for Molecular Bioscience

Prof Robyn Ward, Deputy Vice-Chancellor (Research) (from Sep 2014)

The University of Sydney

Prof Trevor Hambley, Dean of Science

Prof Jill Trewhella, Deputy Vice-Chancellor (Research)

The University of Western Australia

Prof Peter Leedman, Head of the Laboratory for Cancer Medicine, Deputy Director of the West Australian Institute for Medical Research, and Director of 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, Dean of the Australian School of Advanced Medicine, Macquarie University, until Oct 2014; then Director of the John Curtin School of Medical Research, ANU College of Medicine, Biology & Environment

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

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

Observers

Tony Rothnie, Director, BioScience Infrastructure, Research and Higher Education Infrastructure Branch, Research and Strategy Group, Australian Government Department of Education

Meeting dates

Wednesday 16 July 2014 (Canberra)

Wednesday 10 December 2014 (Melbourne)

Committees

Executive Committee of Council

Prof Richard Larkins, AO, Chair of the EMBL Australia Council

Prof Nadia Rosenthal, Scientific Head of EMBL Australia

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

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

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

Prof Trevor Hambley, Dean of Science, University of Sydney

Dr Silke Schumacher, Director of International Relations, EMBL

Mr Silvio Tiziani, Executive Director of EMBL Australia

Meeting dates

Friday 28 March 2014 (teleconference)

Tuesday 9 September 2014 (teleconference)

Monday 8 December 2014 (teleconference)

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 the Sanford–Burnham Medical Research Institute (San Diego, US), the Monash Institute of Medical Research (Melbourne, Australia), and the Walter and Eliza Hall Institute of Medical Research (Melbourne, Australia).

Mr Niall Byrne (until Dec 2014)

Science in Public

Niall is a science writer and publicist based in Melbourne, and Creative Director of Science in Public. The focus of his work is helping scientists bring their work into the public space through the media, events and festivals.

He also guides science organisations in the development of communication strategies to reach their stakeholders, customers and the public.

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.

Prof Peter Currie

Head, Victorian node

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.

Dr David Lovell

Director, Australian Bioinformatics Network (until Dec 2014)

David has worked in research management within the quantitative biosciences domain since 2004. He has been the Bioinformatics and Analytics Leader for CSIRO's Transformational Biology initiative since 2008, and was appointed Director of the Australian Bioinformatics Network in July 2012.

Ms Jane McCausland

Student Program Coordinator

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.

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.

Observers

Ms Toni Stevens, Science in Public (until Aug 2014)

Ms Benita Vincent, Australian Bioinformatics Network (until Aug 2014)

Meeting dates

Wednesday 12 February 2014 (in Melbourne unless otherwise noted)

Wednesday 12 March 2014

Wednesday 9 April 2014

Wednesday 14 May 2014

Wednesday 11 June 2014

Wednesday 9 July 2014 (Canberra)

Wednesday 13 August 2014

Wednesday 10 September 2014

Wednesday 12 November 2014

Bioinformatics Advisory Committee

The role of the Bioinformatics Advisory Committee of EMBL Australia Council is to assist and advise the Council in all matters relating to the provision of bioinformatics and related services to the EMBL Australia research nodes and the Australian life sciences research community.

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

Prof Nadia Rosenthal, Scientific Head of EMBL Australia

Prof Dave Adelson, Head, School of Molecular & Biomedical Science, University of Adelaide

Dr Vivien Bonazzi, Program Director, Genome Informatics and Computational Biology, National Human Genome Research Institute

Prof Paul Bonnington, Director of e-Research at Monash University

Dr Alvis Brazma, Senior Team Leader, Functional Genomics, EMBL-EBI

Dr David Lovell, Director, Australian Bioinformatics Network, and Transformational Biology Bioinformatics & Analytics Leader, CSIRO (until Nov 2014)

Prof Grant Morahan, Director, Centre for Diabetes Research, Western Australian Institute for Medical Research

Prof Mark Ragan, Head of Genomics and Computational Biology, Institute for Molecular Bioscience, University of Queensland

Prof Stuart Ralph, ARC Future Fellow, Dept of Biochemistry and Molecular Biology, Bio21 Institute, the University of Melbourne

Prof Terry Speed, Head of Bioinformatics Division at the Walter and Eliza Hall Institute of Medical Research

Mr Silvio Tiziani, Executive Director of EMBL Australia

Prof Marc Wilkins, Director of the New South Wales Systems Biology Initiative, and Director of the Ramaciotti Centre for Gene Function Analysis, University of New South Wales

Dr Jean Yee Hwa Yang, Senior Lecturer in the School of Mathematics and Statistics, University of Sydney

Observers

Mr Andrew Gilbert, Bioplatforms Australia

Dr Catherine Shang, Bioplatforms Australia

Meeting dates

Wednesday 18 June (SAHMRI, Adelaide)

Wednesday 3 September (Monash University, Melbourne)

Thursday 6 November (University of Melbourne)

STAFF

Research group leaders

Dr Marcus Heisler

Group Leader, University of Sydney node, New South Wales (currently based at EMBL Heidelberg, Germany)

Marcus joined EMBL's Heidelberg laboratory as a group leader in 2009, through EMBL Australia's Faculty Development Program. His research investigates developmental patterning in plants. Prior to joining EMBL he was a postdoctoral researcher in Elliot Meyerowitz's lab at California Institute of Technology. He completed his PhD at Monash University in 2000.

Dr Edwina McGlenn

Group Leader, Australian Regenerative Medicine Institute node, Victoria

Edwina joined EMBL Australia as a group leader in January 2011. Edwina completed a PhD in developmental and molecular biology at the Institute for Molecular Bioscience at the University of Queensland in 2004, identifying novel downstream effectors of Sonic hedgehog in the developing mouse limb. She then became a research fellow in the laboratory of Prof Clifford Tabin, Harvard Medical School, USA, dissecting genetic networks involved in patterning the vertebrate limb and axial skeleton.

Assoc Prof David Lynn

Group Leader, South Australian Health and Medical Research Institute node, South Australia

David joined EMBL Australia as a group leader in medical informatics in the new South Australian node in February 2014. He completed his PhD in Ireland at University College Dublin in 2004, and followed with postdoctoral training at Trinity College Dublin. He held a joint research associate position at Simon Fraser University and the University of British Columbia in Vancouver, before returning to Ireland in 2009 to lead a group at the Irish agriculture and food agency Teagasc. David currently holds a joint appointment as Associate Professor at Flinders University School of Medicine in South Australia.

Assoc Prof Ville-Petteri Mäkinen

Group Leader, South Australian Health and Medical Research Institute node, South Australia

Ville joined EMBL Australia as a group leader in the South Australian node in February 2014. He received his Doctor of Science degree in 2010 from Aalto University in Helsinki, Finland, where he developed computational techniques to investigate the link between complications affecting type 1 diabetes patients and their underlying genetic and metabolic characteristics. Recently, Ville completed postdoctoral studies at the University of California, Los Angeles, with special focus on the causal genetic perturbations of gene regulatory networks in coronary artery disease. He is also an honorary research associate of Imperial College London and a past postdoctoral fellow of the American Heart Association. Ville holds a joint appointment as Associate Professor in the School of Molecular and Biomedical Science at the University of Adelaide.

Dr Nicolas Plachta

Group Leader, Australian Regenerative Medicine Institute node, Victoria

Nicolas joined EMBL Australia as a group leader in July 2011. He completed his PhD at the University of Basel, Switzerland, before undertaking his postdoctoral studies at California Institute of Technology.

Research staff

Currie Group

Prof Peter Currie, Group Leader
Dr Joachim Berger, Senior Research Fellow
Ms Silke Berger, Research Assistant
Dr Catherine Boisvert, Research Fellow
Ms Ophelia Erhlich, PhD Student
Ms Fruszina Fenyves, Research Assistant
Dr Yona Goldshmit, Adjunct Research Fellow
Ms Liana Goodings, Honours Student
Dr Patricia Jusuf, Research Fellow
Mr Zhenhua Li, PhD Student
Mr Wouter Masselink, PhD Student (until Sep 2014)
Dr Lee Miles, Casual Research Assistant
Dr Ivana Mirkovic, Research Fellow
Mr Jeremy Ng Chi Kei, PhD Student
Mr Phong Nguyen, PhD Student (until Dec 2014)

Avnika Ruparelia, Affiliate PhD Student
Ms Carmen Sonntag, Research Assistant
Dr Alasdair Wood, Research Fellow

Heisler Group

Dr Marcus Heisler, Group Leader
Dr Tufail Bashir, Research Fellow
Ms Neha Bhatia, PhD Student
Ms Paola Ruiz Duarte, Technician
Dr Paz Merelo, Research Fellow
Ms Carolyn Ohno, Technician
Dr Hathi Ram, Research Fellow
Dr Sudeep Sahadevon, Research Fellow
Ms Xiulian Yu, PhD Student

Lynn Group

Assoc Prof David Lynn, Group Leader
Mr Manuel Bernal-Llinares, Senior Software Developer
Dr Kenneth Bryan, Senior Research Fellow
Ms Theodosia Charitou, PhD Student/Research Assistant
Dr Damien Drew, Advanced Placement Medical Student
(from Jan 2015)
Ivan Goenawan, Honours Student (from Mar 2015)
Dr Miriam Lynn, Senior Research Fellow
Dr Lisa Schmidt, Honours Student (from Jul 2014)
Ms Anastasia Sribnaia, Laboratory Technician
(from Jul 2014)
Dr Damon Tumes, Senior Research Fellow
(from Nov 2014)

Mäkinen Group

Assoc Prof Ville-Petteri Mäkinen, Group Leader
Dr Song Gao, Research Fellow (from Aug 2014)
Dr Stefan Mutter, Research Fellow (from Feb 2015)

McGlinn Group

Dr Edwina McGlinn, Group Leader
Dr Jesus Casanova, Research Fellow (until Dec 2014)
Mr Eamon Coughlin, PhD Student
Dr Alysha Heimberg, Research Fellow (until Jul 2014)
Dr Olivier Serralbo, Research Fellow
Ms Lisa Wong, Research Assistant

Plachta Group

Dr Nicolas Plachta, Group Leader
Dr Yanina Alvarez, Research Fellow (from Jun 2014)
Dr Stephanie Bissiere, Research Fellow
Dr Stephen Mieruszynski, Research Fellow (until Feb 2015)
Mr Juan Silva, Research Assistant
Dr Melanie White, Research Fellow
Dr Jennifer Zenker, Research Fellow

Rosenthal Group

Prof Nadia Rosenthal, Group Leader
Ms Katya Chan, Honours Student
Ms Anjana Chandran, Research Assistant
Dr Mauro da Costa, Research Fellow
Mr Ryan Debuque, PhD Student
Mr Stuart Emmerson, Honours Student
Dr Milena Furtado, Research Fellow
Dr James Godwin, Research Fellow
Ms Lucy Hersey, Honours Student
Mr Alexei Ilinykh, PhD Student
Dr Alex Pinto, Research Fellow
Dr Ekaterina Salimova, Research Fellow
Ms Suelyn Van Den Helm, UROP Student (until Aug 2014)
Dr Lina Wang, Research Fellow
Ms Julia Wilmanns, Visiting PhD Student (until Jul 2014)

The Bioinformatics Resource

Dr Sean O'Donoghue, Director
Mrs Dalia Abraham, HPC Specialists (until Nov 2014)
Dr Mark Crowe, Outreach, Training and Communications
Mr Gavin D. Graham, Senior IT and Project Manager
Mr William Hsu, HPC Specialist (until Dec 2014)
Mrs Lien Le, Bioinformatics Manager
Mr Michael Nuhn, Web and Informatics Developer
Dr Denis O'Meally, Species Specialist (until Aug 2014)
Dr Wei-Po (Webber) Liao, Bioinformaticians (Support Specialist)
Mr Eric Powell, Bioinformaticians (Support Specialist)
Mr Danny Sheehan, HPC Specialist
Mr Alexander Varlakov, Web and Informatics Developer
Ms Kerri Wait, HPC Specialist (until Feb 2015)
Ms Lanna Wong, Executive Administration

SBI Australia

Dr Sarah Boyd, Developer, Systems Biology Platform
Dr Samik Ghosh, Adjunct Research Fellow
Prof Hiroaki Kitano, Sir Louis Matheson Distinguished Visiting Professor
Dr Yukiko Matsuoka, Adjunct Research Fellow
Dr Hieu Tri Nim, Research Fellow
Dr Saskia Reibe-Pal, Project Officer and Affiliate Research Fellow
Ms Thanh Van Tran, Visiting PhD Student (Jun–Sep 2014)
Dr Madeleine Van Oppen, Adjunct Professor
Dr Patricia Wecker, Visiting Researcher (May 2014)
Mr Allen White, Executive Officer (until Jun 2014)

Dr Mirana Ramialison, Group Leader
Ms Jeannette Hallab, Research Assistant
Dr Michael Eichenlaub, Research Fellow
Dr Markus Tondl, Research Assistant

Australian Bioinformatics Network (until Dec 2014)

Dr David Lovell, Director
Ms Benita Vincent, Executive Officer (until Jun 2014)

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



The EMBL Australia secretariat (L–R): Nadia Rosenthal, Penny Rowlett, Jane McCausland, Silvio Tiziani, Laura Crilley

FUNDING AND STAKEHOLDERS

Statement of Income and Expenditure From 1 January 2014 to 31 December 2014

	Secretariat	Research	Student Program	SBI Aust	Bioinformatics	Total	
Income							
DIISR Funding Agreement (2009)						1,198,901	1
Internal Support (Monash/ARMI Contribution)	1,198,901					1,198,901	
Donations			100,000			100,000	2
Other	(24,305)	10,000				(14,305)	
Commercial (Conference sponsorships, fees)	8,724	496	36,450	3,000		48,671	3
Interest earned on invested income	76,077					76,077	4
Total Income						1,409,343	
Expenditure							
Salaries and Related Expenditure	291,888	506,500	88,687	(6,447)	2,556	883,184	
Sponsorships (Grants/Donations)	5,000		7,218		412,500	424,718	5
Lab & Operating Expenses	1,387	152,814				154,202	
Travel & Related Expenses	50,295	36,624	76,669	(3,664)	636	160,560	
Student Prizes/Awards		(1,000)	97,450			96,450	
Communications Consultancy	88,525					88,525	6
Other Expenses	40,354	7,672	36,047	1,712	732	86,517	
IT Equipment and Related	7,750	42,975	5,905	88		56,718	
Staff Training and Related		5,616	26,343	3,560		35,519	7
Printing & Stationery	11,664	1,338	1,478	379		14,859	
Book and Library	13,727	206	897	37		14,867	
Vehicle Expenses	16,233					16,233	
Telecommunications & Freight	771	3,994	36	282	950	6,033	
Building Expenses	1,904		948	(933)		1,920	
Finance & Admin	124	456	21	21		622	
Audit Fees	1,500					1,500	
Central and Faculty Charges	813,596					813,596	1
Capital Equipment		12,800				12,800	
Total Expenditure						2,868,822	
Net Balance for the year						(1,459,479)	
Balance as at 1 January 2014						2,496,910	
Balance as at 31 December 2014						1,037,431	

Notes

1. Monash and Australian Regenerative Medicine Institute contribution to Monash central support and overhead charges
2. Bioplatfroms Australia donation of \$100,000 to support the 2013 and 2014 EMBL Aus PhD Symposium (\$50,000 each) received in 2014
3. Income generated to support the EMBL Australia PhD Symposium, Dec 2014
4. This represents interest earned by Monash on the principle Commonwealth Funding Agreement 2009
5. Australian Bioinformatics Network Collaboration sponsorship agreement with CSIRO
6. Communication consultants, Science In Public
7. Partner Laboratory Group Leaders recruitment costs

Auditor's report



RSM Bird Cameron
Level 21
55 Collins Street Melbourne VIC 3000
PO Box 248 Collins Street West Melbourne VIC 8007
T +61 3 9286 1800 F +61 3 9286 1999
www.rsmi.com.au

INDEPENDENT AUDITOR'S REPORT TO THE COMMONWEALTH DEPARTMENT OF INDUSTRY AND SCIENCE

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 Industry and Science 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 2014 to 31 December 2014. The Statement specifies an amount of \$2,868,822 of expenditure on the Project and an amount of \$1,409,343 of contributions towards the Project. The management of the Corporate Finance Division of Monash University are responsible for the preparation of the Statement, and for meeting the requirements of the Agreement.

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

In our opinion:

- The Statement of Income and Expenditure for the period 1 January 2014 until 31 December 2014 is true and fair in all material respects;
- The funds have been expended in accordance for the Project and in accordance with the Agreement; and
- The balance of funds as at 31 December 2014 is \$1,037,431

RSM Bird Cameron
Chartered Accountants

WARWICK SPARGO

Director
19 August 2015
Melbourne, Victoria

Liability limited by
a scheme approved
under Professional
Standards Legislation

Birdanco Nominees Pty Ltd
ABN 33 009 321 377
Practising as
RSM Bird Cameron
ABN 65 319 382 479

Major Offices in:
Perth, Sydney,
Melbourne, Adelaide,
Canberra and Brisbane

RSM Bird Cameron is a member of the RSM network. Each member of the RSM network is an independent accounting and advisory firm which practises in its own right. The RSM network is not itself a separate legal entity in any jurisdiction.

Participants

- 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

Funding and in-kind support

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

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

- Financial support to establish Systems Biology Institute 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 (NCRIS)

- Financial contribution to the associate membership subscription

South Australian Health and Medical Research Institute (SAHMRI)

- 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 South Australia

- Financial support for the South Australian node

Victorian Department of Economic Development, Jobs, Transport and Resources

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

CONTACT EMBL AUSTRALIA

EMBL Australia
c/o Australian Regenerative Medicine Institute
Level 1, Building 75
Monash University
Wellington Road
Clayton, VIC 3800

Phone: +61 3 9902 9600
Fax: +61 3 9902 9729

Web: www.emblaustralia.org
Email: info@emblaustralia.org



@EMBLAustralia



EMBL Australia



EMBL Australia

Acknowledgements

Written and edited by Melissa Trudinger and
Margie Beilharz, Science in Public

Design by Linda Cerkenik, Outsource Design

Participants



Secretariat

