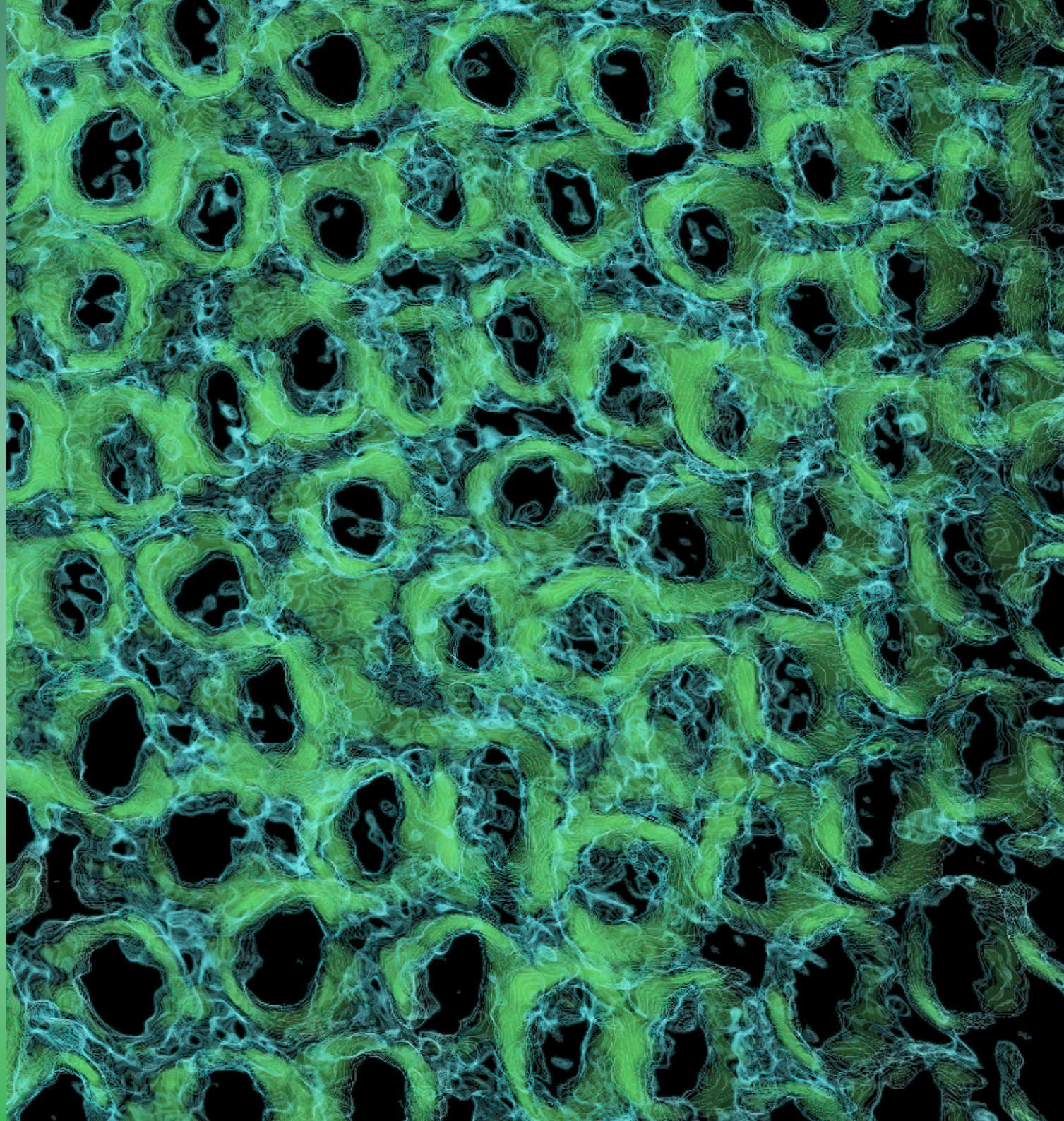
EMBL Australia

Evolution and Impact



2023/2024 Highlights

Image on page 1: Cellularisation of the Drosophila (fruit fly) embryo.
Credit: Arumugam Group.

Contents

Council Chair

FOREWORD

Joining EMBL as an associate member in 2008 has been game-changing for Australia. Our membership has enabled Australia to build strong, deep and enduring relationships with Europe's most prestigious life science network.

Membership has opened doors for the Australian health research and research infrastructure communities to connect with European counterparts and create value through knowledge and data exchange, thought leadership, international collaboration and capacity building. In addition, membership includes access to several unique research infrastructures and capabilities, including, for example, the world-leading bioinformatics capabilities offered by the European Bioinformatics Institute (EMBL-EBI).

For more than 15 years, EMBL Australia has focused on attracting the very best emerging scientists from across the globe to Australia and delivering top-quality science, as well as state-of-the-art interdisciplinary training to the next generation of researchers.

The return on investment is evident. EMBL Australia group leaders across the country are deeply integrated into national and international networks of excellence. They have established themselves as world-class scientists and make significant contributions to Australia's research ecosystem by delivering cutting-edge research and innovative technologies to address pressing challenges in human and planetary health.

Looking ahead, **sustained long-term investment into international partnerships is essential** for Australia to remain at the forefront of health and science research. Our EMBL associate membership enables Australian researchers to participate in shared training programs, exchange opportunities, internships, and webinars, which in turn allows Australia to fully leverage rapid global technological advancements, the expansion of digital research infrastructure, and the transformative power of artificial intelligence. These innovations are revolutionising genomics and other 'omics' fields, drug discovery, and healthcare, driving breakthrough discoveries that benefit both human and planetary health.

To maximise the potential of these emerging technologies and address their challenges, a coordinated global effort is crucial.

Emeritus Professor Ian Smith
Chair of the EMBL Australia Council

EMBL Director General

REPORT

International collaboration is fundamental to achieving Australia's scientific ambitions.

While Australia contributes an impressive 3.3% of the world's scientific publications, Europe - home to a much larger population - produces nearly 35%. Australia's associate membership to the European Molecular Biology Laboratory (EMBL) connects Australia to the world-leading knowledge, expertise and infrastructure that drive high-impact life science research.

Since joining EMBL in 2008, **Australia's engagement has deepened** in countless ways. Some connections have been actively fostered through initiatives such as EMBL's partnership conference, which brings researchers together to build networks and collaborations. Others have emerged incidentally, as Australian scientists work alongside EMBL researchers on joint research activities (including more than 200 co-authored scientific papers between 2020 and 2023) or take part in EMBL's advanced training programs. These interactions have an amplifying effect, increasing and improving access to EMBL's world-class resources for the entire Australian research community.

This **thriving collaboration** is particularly evident in Australia's use of EMBL's European Bioinformatics Institute (EMBL-EBI) data resources. Based in the United Kingdom, EMBL-EBI hosts the world's most comprehensive collection of freely available molecular data, critical for life science research. Australia now consistently ranks within the top five users of these resources among EMBL member states, a significant rise from outside of the top ten just a decade earlier.

Through its associate membership, Australia is not only accessing EMBL's infrastructure, but fully leveraging its expertise and networks to drive cutting-edge research and advance national scientific priorities.

Professor Edith Heard FRS
EMBL Director General

Mission

EMBL Australia is a national life sciences capability dedicated to developing the next generation of Australian life sciences leaders through national and international collaboration.

We attract top scientific talent and provide training, mentorship and long-term support to emerging research and technology leaders, helping them build their careers at Australia's leading universities and medical research institutes.

1 **We internationalise Australia's life sciences**

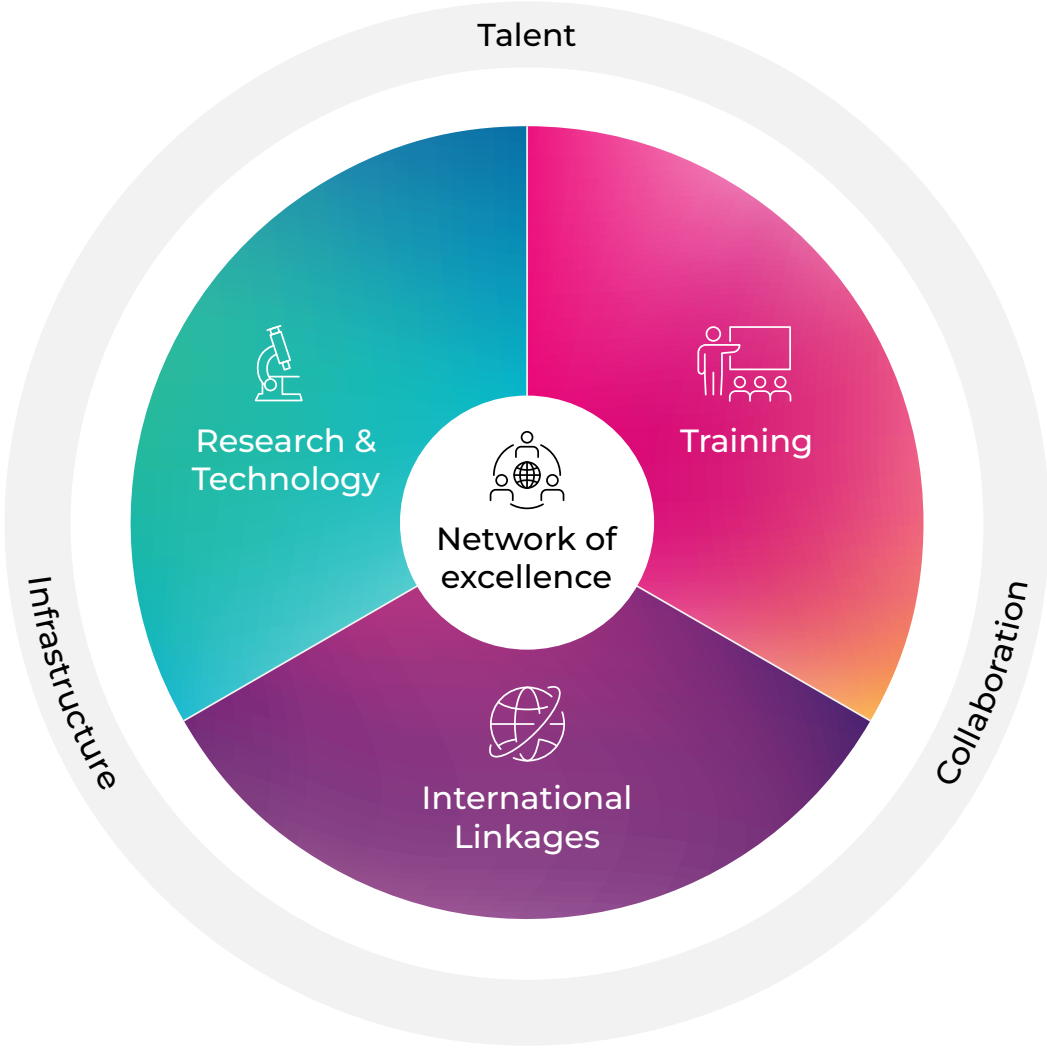
and facilitate access to international research infrastructure capabilities.

2 **We train Australia's life sciences community**

with a focus on talented early career researchers and research infrastructure scientists.

3 **We build a vibrant life sciences network in Australia**

that supports emerging research leaders to deliver excellent science and collaborate with national research infrastructure capabilities.



We value openness, inclusion, integrity, transparency and fairness.

EMBL and Australia

EMBL

The European Molecular Biology Laboratory (EMBL) is an intergovernmental organisation dedicated to molecular biology research and is supported by 29 member states, two prospect member state, and one associate member state - Australia.

EMBL has more than 110 independent research groups and service teams covering a spectrum of disciplines, including molecular biology, physics, chemistry and computer science, at six sites in Barcelona, Grenoble, Hamburg, Heidelberg, EMBL-EBI Hinxton and Rome.

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

EMBL Australia was set up to promote molecular biology in Australia. The Australian Government, through the National Research Infrastructure Strategy (NCRIS), funds Australia's associate membership to EMBL to enable access to Europe's research expertise, infrastructure, databases and training programs for all Australian scientists.

EMBL Australia

EMBL Australia is a national life science capability with a vision to build the next generation of Australian life science leaders. We attract and train talented scientists and emerging technology leaders in Australia.

Monash University is the lead agent for EMBL Australia and hosts the EMBL Australia Secretariat.

Evolution of EMBL Australia

2008

- Monash University
- Australian Government
- The University of Western Australia
- The University of Sydney
- The University Of Queensland
- CSIRO

2011

- Monash University
- Australian Government
- The University of Western Australia
- The University of Sydney
- The University Of Queensland
- CSIRO
- The University of Adelaide
- Australian National University
- UNSW Sydney

2014

- Monash University
- Australian Government
- The University of Western Australia
- The University of Sydney
- The University Of Queensland
- CSIRO
- The University of Adelaide
- Australian National University
- UNSW Sydney
- The University of Melbourne
- SAHMRI

2015

- Monash University
- NCRIS National Research Infrastructure for Australia
- The University of Western Australia
- The University of Sydney
- The University Of Queensland
- CSIRO
- The University of Adelaide
- Australian National University
- UNSW Sydney
- The University of Melbourne
- SAHMRI

2018

- Monash University
- NCRIS National Research Infrastructure for Australia
- The University of Adelaide
- Australian National University
- UNSW Sydney
- Garvan Institute of Medical Research
- QIMR Berghofer Medical Research Institute
- SAHMRI

2024

- Monash University
- NCRIS National Research Infrastructure for Australia
- The University of Adelaide
- Australian National University
- UNSW Sydney
- Garvan Institute of Medical Research
- NCRIS National Research Infrastructure for Australia Health Group
- Burnet
- SAiGENCI

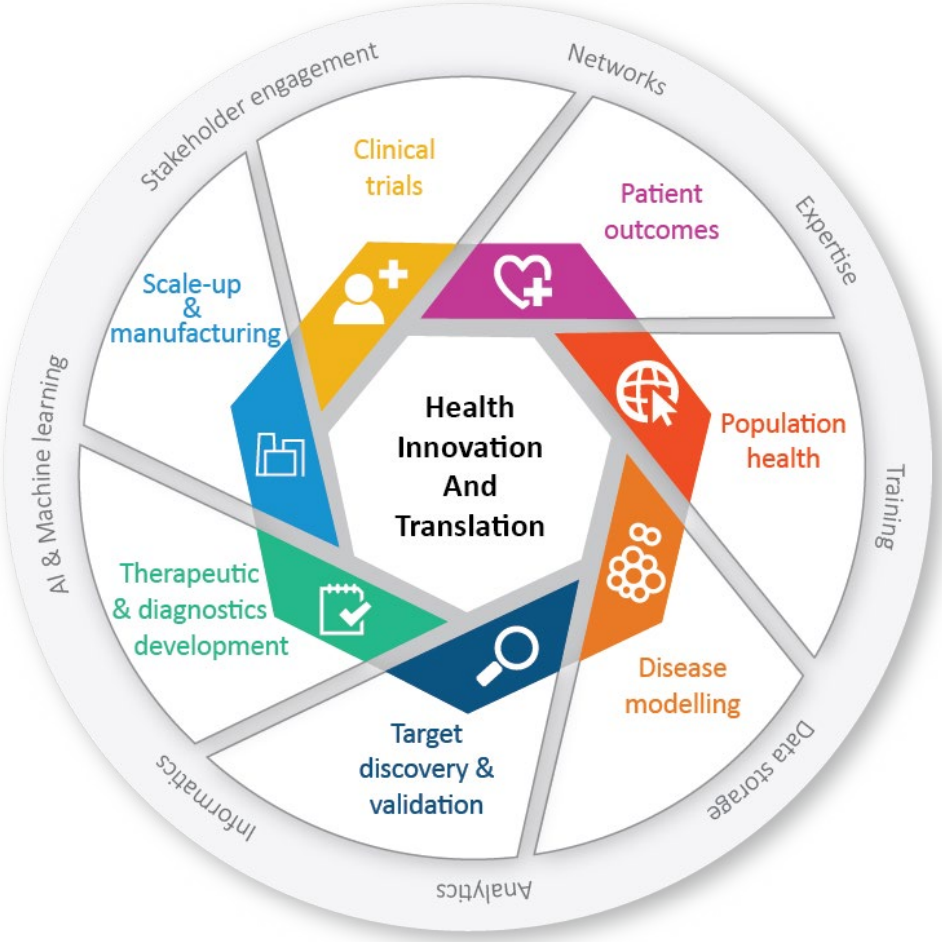
NCRIS Health Group

In 2024, EMBL Australia joined the NCRIS Health Group, enhancing seamless access to Australia's world-class health and medical research expertise and infrastructure to drive innovation and translation.

The NCRIS Health Group works together to address complex health challenges, fostering research innovation and supporting solutions throughout the translational process.

NCRIS National Research Infrastructure for Australia
An Australian Government Initiative

Australian Government



EMBL Australia

BIOPLATFORMS AUSTRALIA

NATIONAL IMAGING FACILITY

Phenomics Australia
Enabling precision medicine

PHRN Population Health Research Network

THERAPEUTIC INNOVATION AUSTRALIA

International Linkages

We internationalise Australia's life sciences and facilitate access to international research expertise and infrastructure.

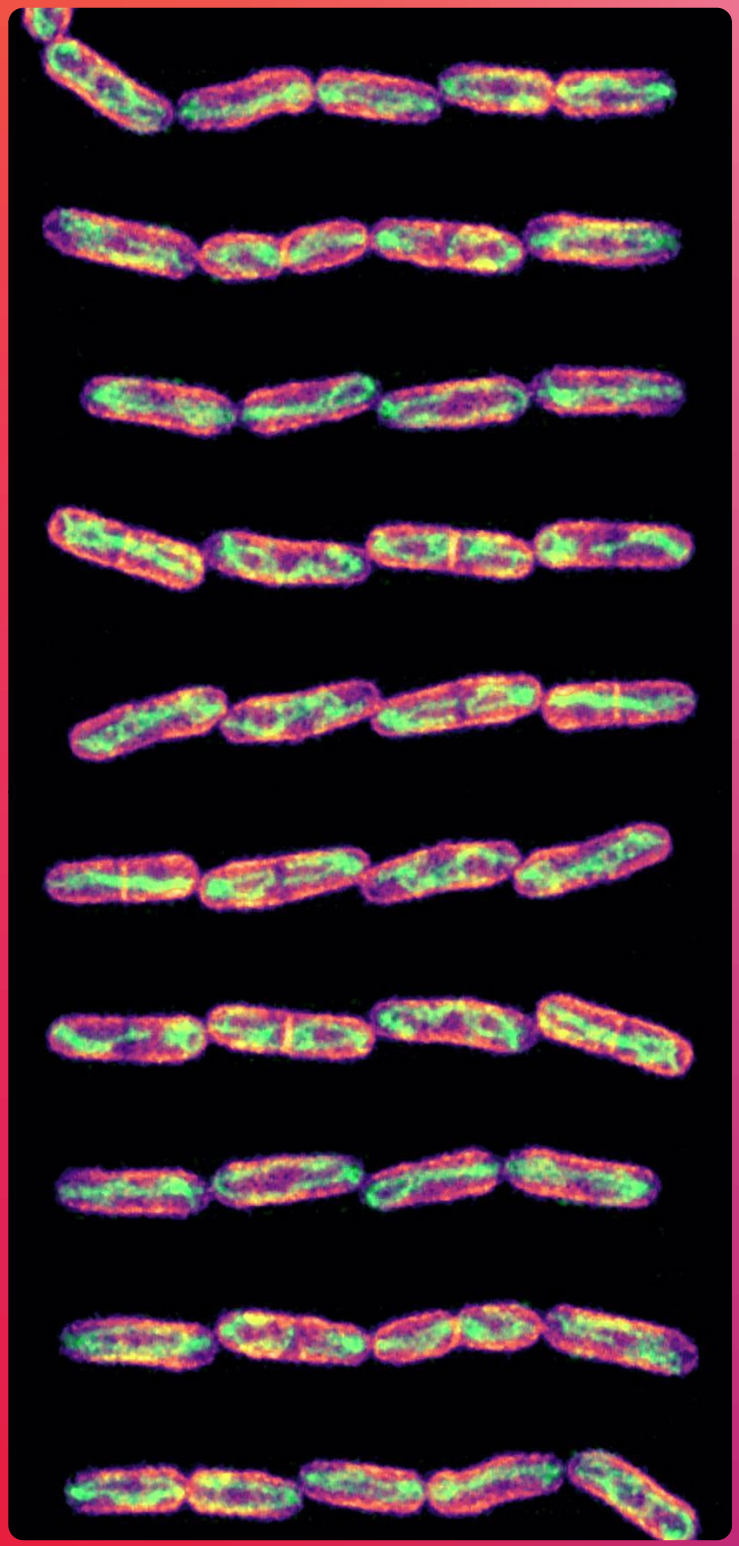


Image A 60-hour time-lapse of fission yeast in a microfluidic machine provides real-time insight into how cells generate and maintain mitochondrial networks across generations. Credit: Ananthanarayanan Group

International linkages

By supporting global mobility and international collaboration, EMBL Australia has made key contributions to the vibrant intellectual ecosystem in Australia.

218

VISITS TO EMBL

164

TRAVEL GRANTS (AUSTRALIAN PHD STUDENTS TRAINING AT EMBL)

Part of EMBL's highly collaborative ecosystem

Our associate membership with EMBL connects Australian scientists to the knowledge, expertise, and infrastructure needed to produce high-quality research.

Beyond access to EMBL's experimental services, Australian researchers benefit from international collaborations and the transfer of research infrastructure expertise.

- Australia consistently ranks within the top five users of EMBL-EBI **data services** among EMBL member states.
- During 2020–2023, Australian and EMBL scientists jointly published over 200 **scientific papers**.
- Australia is home to close to 100 **highly qualified EMBL alumni** who hold senior leadership roles across academia, industry, government and NGOs, embedding their expertise into diverse research environments.
- Australian researchers also participate in EMBL's **training programs** (including PhD, postdoctoral and research infrastructure career accelerator programs) and engage in its courses and conferences, both in person and online.

AI in the Life Sciences

INTERNATIONAL LINKAGES

In 2024, we gathered members of the scientific community at the iconic Shine Dome in Canberra to hear **Professor Ewan Birney**, European Bioinformatics Institute (EMBL-EBI) Director and Deputy Director General of EMBL, speak on the transformative role of artificial intelligence in life sciences.

The public event, co-hosted by **Bioplatforms Australia**, featured talks from international and Australian experts and drew scientists and senior leadership from a range of organisations, including government, as well as postdoctoral researchers and students.

Professor Michael Parker, Director of the Bio21 Institute and EMBL alumnus, and **Dr Merran Smith**, Chief Executive of the Population Health Research Network, also shared their insights. The event was followed by a reception to mark 50 years of world-class science at EMBL.

Prof Ewan Birney describes how AI is revolutionising genomics, drug discovery and healthcare.

Event chairs and speakers outside the Shine Dome. (L-R: Erica Kneipp, James Whisstock, Ewan Birney, Ian Smith, Merran Smith, Elizabeth Gardiner, Michael Parker)

Scientific excellence without borders

INTERNATIONAL LINKAGES

Associate Professor Robert Weatheritt exemplifies how Australia's EMBL membership attracts top-tier global talent, fosters valuable international collaborations and positions Australia at the forefront of life sciences research.

> A/Prof Robert Weatheritt was awarded a $1.3m Viertel Senior Medical Research Fellowship to support his cancer research in 2022, making him the fourth EMBL Australia group leader to receive the coveted fellowship.

Garvan Institute of Medical Research

After earning his PhD at EMBL Heidelberg and the University of Heidelberg, he secured a Marie Curie Postdoctoral Fellowship, enabling him to work with renowned experts in Cambridge and Toronto.

Bringing this wealth of experience and international connections, A/Prof Weatheritt established his own lab in 2018 as an EMBL Australia group leader at the Garvan Institute.

The Weatheritt Group investigates how cells convert genetic instructions into proteins and how errors in this process contribute to diseases like cancer and complex brain disorders, with the goal of developing innovative therapeutic interventions.

His work has been recognised with prestigious awards - including an Australian Research Council (ARC) Future Fellowship and a Viertel Fellowship - and is widely published in high-impact journals, such as *Nature*, *Cell* and *Science*.

He remains closely connected to EMBL through regular collaborations and visits, presenting at 'The Complex Life of RNA' conference at EMBL Heidelberg in 2024 and the 5th EMBL Partnership Conference on 'AI in One Health' in 2025.

See A/Prof Weatheritt's highlight publications ↗

Connecting global health research infrastructures

INTERNATIONAL LINKAGES

Health research infrastructure symposium 2023

In 2023, EMBL Australia co-delivered the inaugural **Australian and European Health Research Infrastructure Symposium** at the Monash University Prato Centre in Italy.

Australian NCRIS health capabilities met European counterparts from EMBL and the European Strategy Forum on Research Infrastructure (ESFRI) facilities to share insights into emerging trends, shared challenges and opportunities for collaboration and workforce training.

Satellite meeting at ICRI 2024

We joined more than 400 global research infrastructure experts at the 2024 **International Conference on Research Infrastructures** in Brisbane in December and co-hosted a satellite meeting focused on collaboration between European and Australian health research infrastructures specifically, further strengthening connections made at the 2023 Prato symposium.

Outlook 2025

Planning is underway for a third Health Research Infrastructure meeting in Prato in September 2025.

European and Australian health infrastructure leaders tour EMBL's world-class research facilities in 2023.

EMBL Australia Scientific Head Prof James Whisstock presents at ICRI 2024 on AI and advanced imaging techniques.

EMBL Australia

NCRIS National Research Infrastructure for Australia An Australian Government Initiative

ESFRI European Strategy Forum on Research Infrastructures

Growing bioinformatics capability through global collaboration

INTERNATIONAL LINKAGES

Australia's membership of EMBL is unlocking powerful international collaborations that are strengthening national research infrastructure and positioning Australia at the forefront of global developments in the life sciences.

A prime example is Australian BioCommons, supported by Bioplatforms Australia, which delivers national digital infrastructure to support Australia's biomolecular research community.

Through close engagement with EMBL-EBI and an accompanying collaboration with EMBL's strategic partner, ELIXIR, Australian BioCommons is helping to build national bioinformatics capability through leveraging and contributing to global expertise.

These collaborations are enabling Australian researchers to access cutting-edge tools, training and knowledge and to contribute meaningfully to international initiatives in areas such as data sharing, workflows and AI.

This was highlighted on the global stage at the 2024 International Conference on Research Infrastructures (ICRI) in Brisbane, where Australian BioCommons presented its successful approach to international collaboration.

Further cementing these ties, Australian BioCommons and Bioplatforms Australia hosted a high-level workshop in Melbourne in 2024 with Prof Ewan Birney, Director of EMBL-EBI, which focused on the transformative potential of AI in the life sciences and brought together infrastructure leaders and researchers to identify shared opportunities between Australia and Europe in this space.

A memorandum of understanding between Australian BioCommons, Bioplatforms Australia and EMBL is now in development, representing another step forward in deepening the relationship and ensuring that Australian science continues to benefit from - and contribute to - the EMBL ecosystem.

L-R: Prof Ewan Birney, Andrew Gilbert, Dr Jeff Christiansen and Prof Andrew Lonie talk AI in the life sciences

Network of excellence

We connect Australia's brightest scientific minds with each other, international collaborators and national research infrastructure to cultivate the next generation of thought leaders, driving innovation, collaboration and world-class research.

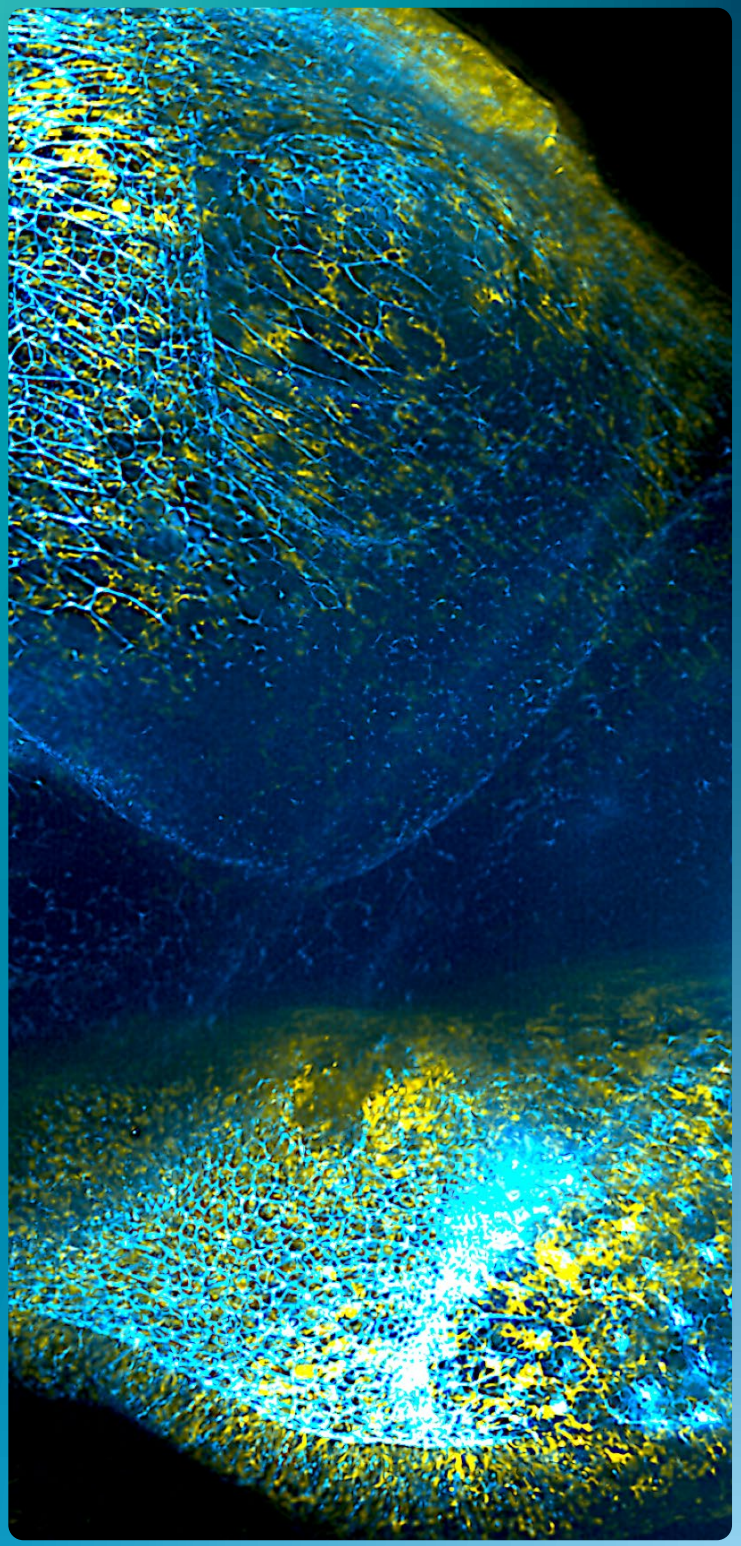
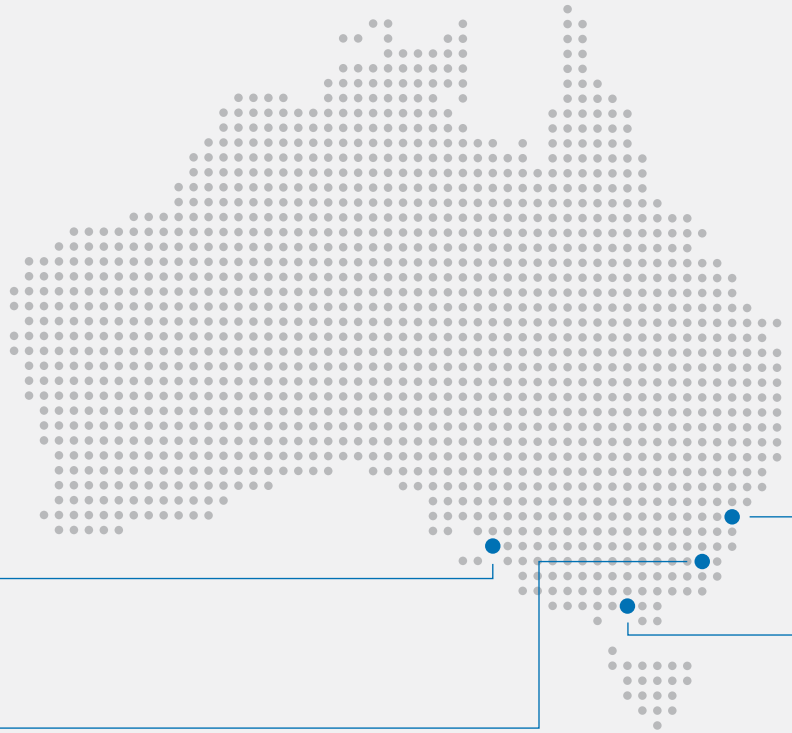


Image Developing fruit fly (drosophila) eye tissue, showing specific markers for cadherin proteins and mitochondria. Credit: Arumugam Group.

Partner Laboratory Network

EMBL Australia implements the 'EMBL model' to attract exceptional international talent to Australia, emphasising the importance of long-term funding for ambitious life science research.



Adelaide

SAHMRI — South Australian Health & Medical Research Institute
SAiGENCI — South Australian Immunogenomics Cancer Institute

Qi Zhang
Cancer epigenetics

David Lynn
Systems immunology
Alumni

Pirjo Apaja
Membrane trafficking
Alumni

Ville-Petteri Mäkinen
Systems epidemiology
Alumni

Canberra

Australian National University

Eduardo Eyras
Computational RNA biology

Sydney

UNSW Sydney

Richard Morris
Theoretical biophysics

Vaishnavi Ananthanarayanan
Cytoskeleton and molecular motors

Yann Gambin
Single molecule science
Alumni

Maté Biro
Immune response
Alumni

Garvan Institute of Medical Research

Robert Weatheritt
RNA biology

Melbourne

MONASH University

Senthil Arumugam
Cellular physiology

William Roman
Muscle cell biology

Edwina McGlinn
Skeletal development
Alumni

Harald Janovjak
Synthetic biology
Alumni

Nicolas Plachta
Embryo biology
Alumni

Max Cryle
Antibiotics and bacterial infections
Alumni

Mikaël Martino
Tissue regeneration
Alumni

Chen Davidovich
Chromatin biology
Alumni

Burnet

Michelle Boyle
Malaria immunology

Research excellence snapshot

EMBL Australia group leaders are emerging science leaders, already making a significant impact at the early stages of their careers.

Their growing track record of research excellence demonstrates what they can achieve today - and offers a glimpse of the breakthroughs yet to come.

2023–24	155 RESEARCHERS ACROSS 13 RESEARCH GROUPS	130 PUBLICATIONS BY GROUP LEADERS	$87.1m EXTERNAL FUNDING	420 PARTICIPANTS AT TRAINING EVENTS	5 PATENTS FILED, SPIN-OUTS & START-UPS
All time	300 RESEARCHERS ACROSS 20 RESEARCH GROUPS	645 PUBLICATIONS BY GROUP LEADERS	$210m+ EXTERNAL FUNDING	2160 PARTICIPANTS AT TRAINING EVENTS	14+ PATENTS FILED, SPIN-OUTS & START-UPS

Driving excellence in research, collaboration and innovation

NETWORK OF EXCELLENCE

EMBL Australia group leaders are deeply integrated into Australian and international networks of excellence. They have established themselves as scientists and drive research and innovation in areas of national scientific priority.

Prof Max Cryle, a Monash Biomedicine Discovery Institute researcher whose nine-year tenure as an EMBL Australia group leader recently ended, leads the Victorian node of the $35M Australian Research Council (ARC) Centre of Excellence for Innovations in Peptide and Protein Science and oversees its training and mentoring programs.

Current group leaders **Prof Eduardo Eyras** (ANU) and **A/Prof Richard Morris** (UNSW Sydney) are chief investigators in the ARC Centre of Excellence for the Mathematical Analysis of Cellular Systems, which applies advanced mathematics to model biological processes and develop biotechnological applications, and partners with the NCRIS-funded **Bioplatforms Australia**.

Australia's ARC Centres of Excellence are hubs of expertise, fostering collaboration and advancing Australia's global research standing in areas of national importance.

See Prof Cryle's highlight publications ↗

See Dr Morris' highlight publications ↗

See Prof Eyras' highlight publications ↗

MONASH University | MONASH BIOMEDICINE DISCOVERY INSTITUTE

UNSW SYDNEY

Australian National University

Next-generation talent

EMBL Australia attracts exceptional group leaders and top postdocs from overseas to its Partner Laboratory Network, bolstering Australia's talent pipeline and fostering the next generation of scientific leaders.

The 'EMBL model' empowers early-career scientists to establish their first independent research groups and address fundamental scientific challenges. With funding for up to nine years (five years initially, with an additional four upon successful review), the model shields researchers from the uncertainties of Australia's funding system. It provides a robust platform for launching independent careers, ensuring these talented scientists become key contributors to academia, medicine, industry, and the broader community.

Talent snapshot

44
PHD STUDENTS

30+
NATIONALITIES

34
POSTDOCS

18
RESEARCH STAFF

11
MASTERS, HONOURS & UNDERGRADS

40+
PHD COMPLETIONS

The internationally renowned EMBL brand empowers our group leaders to recruit the brightest minds from around the world, ensuring Australian labs are filled with high-calibre staff and enriched by diverse talent.

Source: EMBL Australia data of research groups in 2024 (excluding alumni groups).

Decoding epigenetics to unlock new cancer therapies

NEXT-GENERATION TALENT

EMBL Australia group leaders conduct ambitious, foundational research that paves the way for addressing some of the greatest health challenges in modern medicine.

> Dr Qi Zhang was awarded a prestigious $1.25m CSL Centenary Fellowship in 2024 to advance her epigenetics research.

Dr Qi Zhang hopes to uncover fundamental epigenetic insights that equip scientists worldwide with the knowledge to develop new cancer therapies and treatments for developmental diseases.

At the South Australian immunoGENomics Cancer Institute (SAiGENCI), Dr Zhang and her team study how cells regulate gene expression during identity changes, such as when stem cells develop into mature cell types.

She investigates the intricate process of DNA packaging in healthy cells to understand what goes awry in cancer cells, integrating methodologies from biochemistry, structural biology, cell biology, genomics and bioinformatics.

By examining the structure and function of epigenetic modifiers - key regulators of gene expression and cell behaviour - Dr Zhang aims to uncover how these mechanisms can break down, leading to cancer and other diseases.

Prior to becoming the first EMBL Australia group leader at SAiGENCI in 2023, Dr Zhang was a high-achieving postdoctoral fellow in EMBL Australia's Davidovich Group.

See Dr Zhang's highlight publications ↗

Photo credit: Stepping Stone Films

SAiGENCI
SOUTH AUSTRALIAN IMMUNOGENOMICS CANCER INSTITUTE

Building lab-grown muscles to study ageing and disease

NEXT-GENERATION TALENT

EMBL Australia group leaders pioneer groundbreaking technologies to tackle longstanding scientific challenges.

> Dr William Roman was awarded a 2024 Metcalf Prize for Stem Cell Research by the National Stem Cell Foundation of Australia for his work growing human muscles on a chip to better understand intracellular communication.

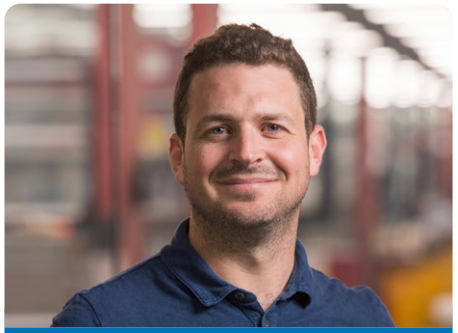
Dr William Roman is growing human muscles on a chip to understand how skeletal muscle cells - the largest in the human body - connect with neurons and tendons to create functioning muscles.

His research also explores how communication between neurons and muscle cells deteriorates with age and in degenerative diseases, like motor neuron disease.

By using 'mini-muscles', Dr Roman aims to uncover fundamental principles of intercellular communication, advancing organ-mimicking technologies.

His team at the Australian Regenerative Medicine Institute (ARMI) integrates diverse approaches - including optogenetics for cell manipulation, advanced microscopy and spatial genomics - to push the boundaries of stem cell research for disease modelling, drug screening, cellular agriculture, and biorobotics.

Dr Roman moved from Stanford University to join Monash University as an EMBL Australia group leader in 2023.



See Dr Roman's highlight publications ↗

MONASH University | ARMI AUSTRALIAN REGENERATIVE MEDICINE INSTITUTE | Baker HEART & DIABETES INSTITUTE

Advancing cell biology and equity in science

NEXT-GENERATION TALENT

Dr Vaishnavi Ananthanarayanan is an innovative cell biologist whose research explores the intricate mechanisms of cellular organisation and a passionate advocate for equity, diversity and inclusion (EDI) in science.

> Dr Vaishnavi Ananthanarayanan received the 2025 Royal Microscopical Society Life Sciences Award for her use of novel microscopy techniques in cell biology, becoming the first recipient outside Europe.

Dr Ananthanarayanan (UNSW Sydney) studies cellular dynamics in the crowded environment of mammalian cells using advanced live-cell microscopy.

Her work has provided key insights into the regulation of motor proteins and the cytoskeleton, with important implications for diseases like neurodegeneration and cancer, where these processes often go awry.

She has received numerous accolades, including the EMBO Young Investigator Award (2019), the ASCB Junior Award for Excellence in Research (2021) and the UNSW School of Biomedical Sciences Researcher of the Year Award (2023).

Beyond her research, Dr Ananthanarayanan is a leader in promoting inclusivity in science.

She co-founded BiasWatchIndia to combat gender-biased panels at Indian conferences and founded the EDI Journal Club at UNSW's Single Molecule Science Node to foster discussions on enhancing inclusivity in academia.

Her international leadership in EDI is reflected in numerous peer-reviewed publications on the topic, as well as invited opinion pieces in prestigious journals, including *Nature Cell Biology*.

See Dr Ananthanarayanan's highlight publications ↗

UNSW SYDNEY

Research & technology

We foster a vibrant life sciences network in Australia, empowering emerging research leaders to deliver excellent science and collaborate with national research infrastructure.

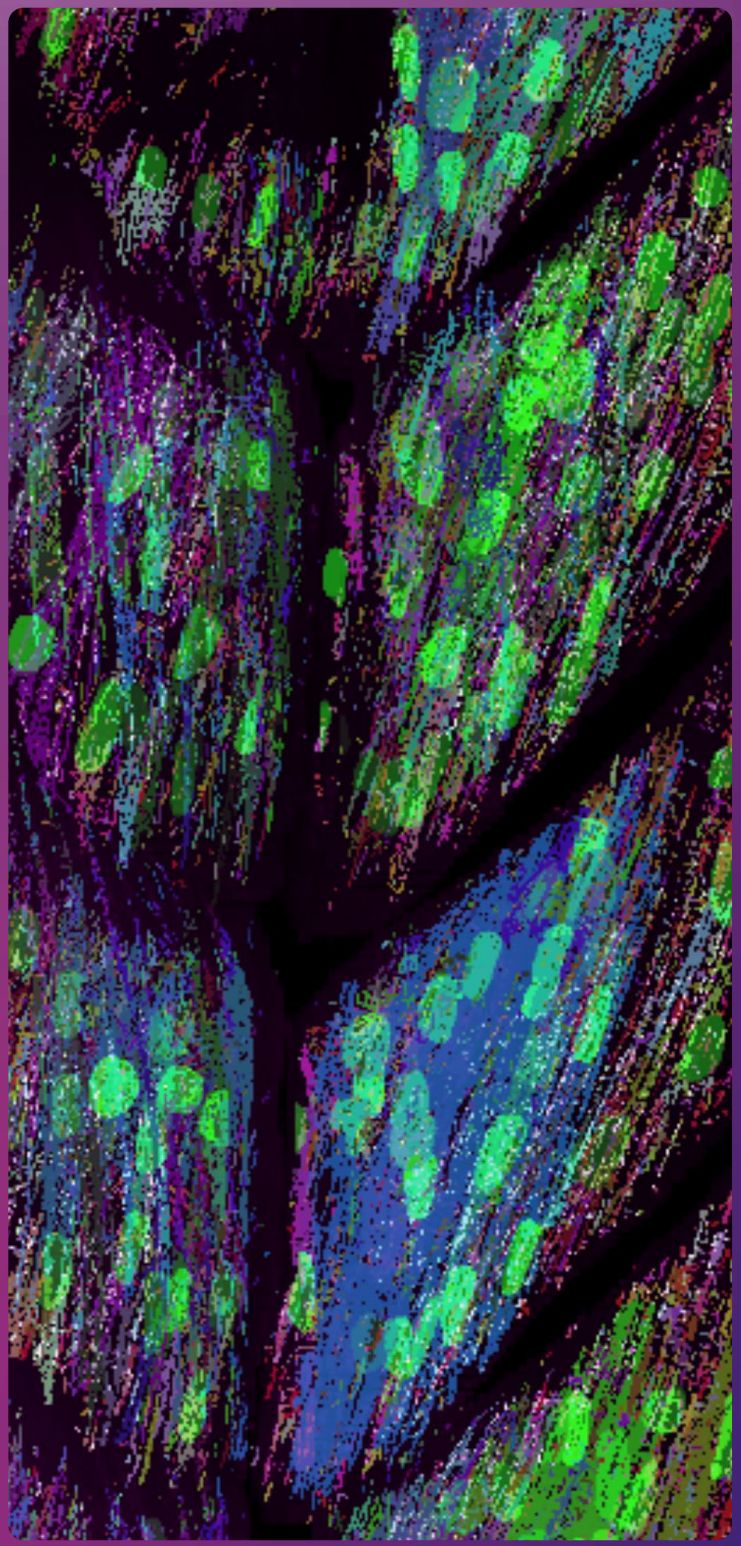


Image Zebrafish muscle cells captured using the Arumugam Group's custom Airy beam light-sheet microscope. Credit: Arumugam Group.

Grants and fellowships

EMBL Australia group leaders have successfully secured more than $210 million in competitive external funding - including collaborative grants and as chief investigators in two prestigious ARC Centres of Excellence - and nearly $17 million in valuable philanthropic funding.

$210m+

AWARDS

Source: PowerBI, SciVal and EMBL Australia data (2012-2024, includes two CoEs).

SNOW MEDICAL FELLOWSHIP

CSL CENTENARY FELLOWSHIP

NHMRC L1 LEADERSHIP FELLOWSHIP

NHMRC L2 LEADERSHIP FELLOWSHIP

NHMRC CAREER DEVELOPMENT FELLOWSHIP

ARC FUTURE FELLOWSHIP

ARC DECRA AWARD

VIERTEL FOUNDATION SENIOR MEDICAL RESEARCH FELLOWSHIP

JEROME LEJEUNE POSTDOCTORAL FELLOWSHIP

MARIE CURIE FELLOWSHIP - EUROPEAN COMMISSION

Philanthropy driving better malaria treatments for children

RESEARCH LEADERSHIP

Among the EMBL Australia group leaders who have successfully secured significant philanthropic funding is **A/Prof Michelle Boyle**, an emerging leader in malaria research at the Burnet Institute.

> In 2023, A/Prof Michelle Boyle was awarded Australia's largest philanthropic biomedical fellowship - the $8m Snow Medical Fellowship - to support her research into malaria immunity.

With major support from the Snow Medical Fellowship ($1 million per year for eight years), she is leveraging novel insights into human immunity to develop new vaccines and treatments for malaria - a leading cause of death in children under five worldwide.

Her work focuses on studying how the human immune system directly responds to malaria in tissues like tonsils and spleens, and designing host-directed therapy that can boost immunity and protection from disease.

Using these unique clinical samples from malaria patients and a lab-based system that mimics immune processes, her team is identifying therapeutics to strengthen the immune response.

The findings could also benefit people with other chronic infections, as well as vulnerable groups, like the elderly and immunocompromised.

See A/Prof Boyle's highlight publications ↗

Burnet

SNOW MEDICAL

Transforming local genomics research with world-class infrastructure

RESEARCH INFRASTRUCTURE

The long-term support and stability provided to EMBL Australia group leaders have enabled them to drive transformative advances in Australian research infrastructure.

One standout example is **Prof David Lynn**, whose vision and leadership during his tenure as an EMBL Australia group leader at SAHMRI and Flinders University were pivotal in establishing the South Australian Genomics Centre (SAGC) - a multi-million-dollar, state-of-the-art facility that opened in 2020.

As the inaugural Scientific Director of the SAGC, Prof Lynn played a crucial role in the creation of this cutting-edge national genomics facility, which is supported by **Bioplatforms Australia** (via **NCRIS**), the **South Australian Government** & other partners.

The SAGC provides comprehensive genomics and bioinformatics services, supporting a wide range of research fields including animal, plant, environmental, microbial and human genomics.

Supported by **NCRIS**, a uniquely Australian initiative, the facility exemplifies its collaborative approach to maximising research infrastructure through open access, targeted specialisation and co-funding.

Advancing Australia's microscopy capability

RESEARCH INFRASTRUCTURE

EMBL Australia has played a key role in establishing the Monash Ramaciotti Centre for Cryo-Electron Microscopy, a major addition to Australia's national microscopy infrastructure.

In 2024, the Centre launched the state-of-the-art Titan Krios G4 microscope, funded by **Microscopy Australia** (via **NCRIS**), the Victorian Government (via the **Victorian Higher Education State Investment Fund**) and **Monash University**.

To mark this milestone, EMBL Australia partnered with **Microscopy Australia**, the **Chan Zuckerberg Initiative** and **CryOZ** to host a five-day cryo-electron tomography masterclass, equipping researchers with advanced imaging expertise.

This investment in cutting-edge technology and training is expanding Australia's capability in high-resolution structural biology, supporting breakthroughs in biomedical research.

Identifying gaps & driving solutions in RNA research infrastructure

RESEARCH INFRASTRUCTURE

His nine-year tenure as an EMBL Australia group leader allowed **Prof Chen Davidovich** to make and nurture connections with other ambitious researchers across Australia, enabling him to identify a critical gap in the nation's research infrastructure and address it by establishing a dedicated RNA mass spectrometry platform.

Now leading a $4m Medical Research Future Fund (MRFF) project, Prof Davidovich (Monash University) is developing this platform to support local RNA therapeutics development and enable earlier detection of diseases, including cancer.

In collaboration with current and alumni EMBL Australia group leaders, **Prof David Lynn** (SAHMRI) and **Dr Qi Zhang** (SAiGENCI), and leveraging state-of-the-art NCRIS facilities at **Bioplatforms Australia** nodes, this initiative will deliver comprehensive quality assessments of mRNA and RNA therapeutics.

Prof Davidovich said the MRFF National Critical Research Infrastructure (NCRI) initiative will facilitate access to new RNA therapeutics for a range of conditions - including cancer, infectious diseases, auto-immune and metabolic diseases - and support the identification of early disease biomarkers, paving the way for innovative treatments.

See Prof Davidovich's publications ↗

Translation

EMBL Australia group leaders demonstrate their entrepreneurial spirit by translating their preclinical findings and developing exciting novel health technologies.

8
PATENTS FILED

6
SPIN-OUTS AND START-UPS

2023	Martino	Fc-NAMPTcif fusion protein	Provisional	Spin-out
2023	Martino	Engineered neuropeptide and extracellular matrix proteins	Provisional	Patent
2023	Biro	Peptides for beta-cell survival and insulin production	USA	Patent
2023	Biro	Modified receptors and ligands	Australia	Patent
2023	Biro	synPair Biosciences Pty Ltd	Australia	Spin-out/start-up
2022	Martino	Truncated and fusion proteins	National phase	Spin-out
2022	Martino	Plasminogen Fc fusion	International	Patent
2022	Eyras	A method of analysing sequence data	Australia	Patent
2021	Cryle	Antibiotic conjugates for enhanced clearance of bacterial infections	Australia	Patent
2021	Martino	Methods and compositions	National phase	Spin-out
2021	Martino	Fusion proteins	National phase	Start-up
2020	Lynn	Methods and products to reduce side effects of immune agonist antibodies	International	Patent
2020	Martino	Cytokine or growth factor fusion proteins	International	Patent
2019	Gambin	Confocal microscope	USA	Spin-out

Source: EMBL Australia data (2018-2024)

Powerful printable single-molecule microscope to revolutionise diagnostics

TRANSLATION

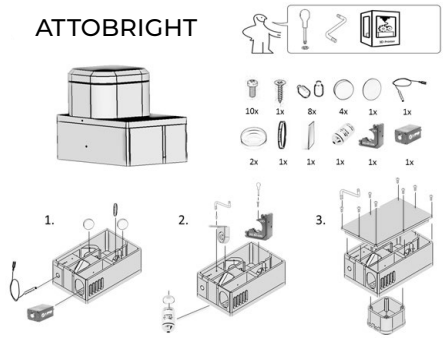
In addition to translating discoveries to improve patients' lives, our group leaders develop transformative tools for the scientific community. One such innovation is a freely available, ultracompact and highly sensitive 3D-printed microscope with the potential to revolutionise health diagnostics.

Attobright, the portable, single-molecule microscope created by **A/Prof Yann Gambin** and Dr Emma Sierecki (UNSW Sydney), simplifies rapid disease screening and diagnosis. It is freely available for researchers to download, build and use, overcoming the typical barriers of expensive and cumbersome diagnostic technology, and has been used in labs throughout Australia, Europe and Canada.

The team also developed a one-step assay that enables the early, accurate and fast detection of Parkinson's disease, one million times more sensitive than previous methods. This breakthrough allows for diagnosis before motor symptoms appear, enabling earlier therapeutic intervention and improving patient outcomes. Unlike traditional methods that require cerebrospinal fluid samples, the Gambin Group is working on diagnostics that use a single drop of blood, which could extend to **Alzheimer's** and other **neurodegenerative diseases**.

The Gambin Group is also adapting this technology for early diagnostics of **tuberculosis, antibiotic resistance** and **sepsis in neonates** using just small blood samples.

See A/Prof Gambin's highlight publications ↗



UNSW SYDNEY

Building biotech to transform regenerative medicine

TRANSLATION

A/Prof Mikaël Martino (Monash University) is a renowned innovator in regenerative medicine, known for translating groundbreaking technologies into impactful solutions with the potential to reshape tissue repair and improve patient outcomes.

With a strong track record of securing seed funding and fostering international collaborations, A/Prof Martino is committed to driving advancements in the field through his patented technologies and biotech ventures.

Myostellar, a biotech company led by A/Prof Martino and Prof Peter Currie from the Australian Regenerative Medicine Institute, develops much-needed new therapies to treat debilitating muscular dystrophies.

An exciting discovery made by the researchers, published in *Nature* in 2021, was the catalyst for the start-up, which is focused on developing a novel, first-in-class therapy for stimulating skeletal muscle regeneration with minimal fibrosis.

A/Prof Martino is also the co-founder of protein-engineering spin-out Orio Therapeutics, which aims to spearhead the development of new drug-delivery technology that enables better therapeutic effects at consistent and lower doses.

See A/Prof Martino's highlight publications ↗

Guiding cancer-fighting cells to solid tumours

TRANSLATION

A/Prof Maté Biro (UNSW Sydney) combines his expertise in cellular biology and advanced microscopy to improve cancer treatment efficacy, paving the way for next-generation therapies that could revolutionise the fight against cancer.

In 2023, A/Prof Maté Biro (UNSW Sydney) developed a groundbreaking technology to guide cancer-fighting cells directly to tumours.

Through his spin-out, **synPair Biosciences**, he is creating safe synthetic homing signals that direct immune cells used in cell therapies to specific tissues or organs, overcoming a major barrier in treating solid cancers by ensuring enough cells infiltrate tumours.

A/Prof Biro, whose nine-year term as an EMBL Australia group leader recently concluded, leverages advanced microscopy to study how the actin cytoskeleton drives tumour cell invasion and immune cell movement, aiming to uncover fundamental processes and develop innovative research methods.

See A/Prof Biro's highlight publications ↗

Training

We train Australia's life science community, focusing on talented early-career researchers and research infrastructure scientists.

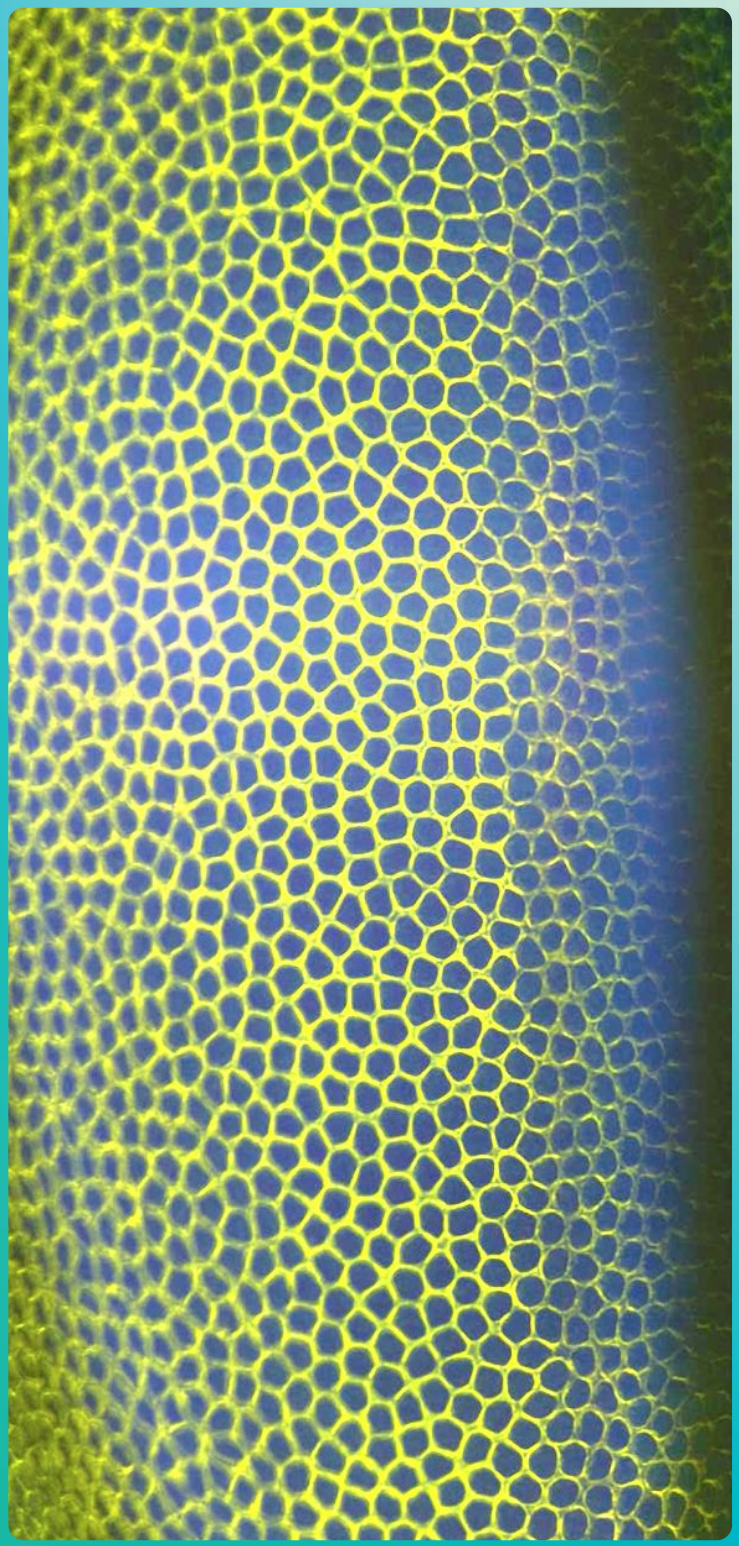


Image A developing Drosophila (fruit fly) embryo. Credit: Arumugam Group.

Training

Over the last decade, EMBL Australia has delivered extensive training with national reach, including annual PhD courses, student-led conferences and technical training, which commenced in 2023 in response to high demand.

PhD Course

9	523
COURSES	PARTICIPANTS

Student Symposium (EAPS)

10	960
SYMPOSIA	PARTICIPANTS

Scientific Summit

6	239
SUMMITS	PARTICIPANTS

Technical Training

4	133
WORKSHOPS	PARTICIPANTS

Source: EMBL Australia data (2012-2024)

Empowering the next generation

For more than a decade, the EMBL Australia PhD Course has provided a transformative, intensive learning experience that goes far beyond traditional academic training.

Each year, 60 high-achieving PhD students from diverse research fields and institutes come together to explore the latest advancements in life sciences, build lasting professional networks and gain career insights.

The much-loved course has helped shape the careers of hundreds of PhD students, many of whom credit the course a highlight of their doctoral journey, and ensures the next generation of researchers is set up for success.

In their own words

“From cutting-edge discussions in molecular biology and bioinformatics, to engaging with brilliant minds across various fields, this course truly broadened my perspective and deepened my passion for research.”

HARESH, UNIVERSITY OF QUEENSLAND

“The overall experience, and meeting everybody, has been the best thing I have done in my PhD.”

JAMES, UNIVERSITY OF SOUTH AUSTRALIA

“A PhD is so much more than your project. The skills gained from this journey can be applicable to a number of different career paths.”

CHARNÉ, SAHMRI

Developing advanced imaging tools to benefit the scientific community

ADVANCED IMAGING TRAINING

Dr Senthil Arumugam, an EMBL Australia group leader at the Monash Biomedicine Discovery Institute, is advancing Australia's scientific infrastructure by developing world-class imaging tools - including a lattice light-sheet microscope with adaptive optics - to deliver exciting new findings.

This cutting-edge technology has provided unprecedented insights into molecular processes and established him as one of the few experts globally with this capability.

Dr Arumugam is committed to capacity building and workforce development by training the next generation of researchers in developing and using powerful advanced imaging tools.

In 2024, he was the lead scientific organiser of EMBL Australia's imaging workshop, bringing international leaders together to address challenges in light-sheet microscopy. He also organised symposiums and interactive training sessions, ensuring his innovations benefit Australia's research community and beyond.

In 2025, Dr Arumugam, along with Dr Toby Bell and Dr Kate McArthur, established Monash BDI Advanced Bioimaging (MAB), a researcher-led global collaboration centre dedicated to bringing advanced microscopy innovations and technology to leading biologists.

MAB integrates commercial and in-house developed techniques, custom quantitative analysis, and data visualisation to overcome barriers in cutting-edge imaging, such as light-sheet microscopy, and to elevate research strategies through collaboration.

See Dr Arumugam's highlight publications ↗

MONASH University | MONASH BIOMEDICINE DISCOVERY INSTITUTE

Training researchers at the intersection of biomedical and computational sciences

CROSS-DISCIPLINARY TRAINING

In an era of transforming technologies in molecular sequencing, imaging, and artificial intelligence, there is an urgent need for skilled researchers who can bridge the gap between biomedical and computational sciences.

At our ANU node, EMBL Australia group leader **Professor Eduardo Eyras** is Director of the ANU's Centre for Computational Biomedical Sciences (CCBS), and focused on developing advanced computational and medical technologies to enable discovery and interpretation in biomedical research.

One game-changing initiative is the **Talo Computational Biology Talent Accelerator**, a pioneering program established with the help of a $2.5 million donation from biotech start-up Talo. The initiative provides scholarships, courses and grants to provide top students and early-career researchers with the skills needed to tackle complex biomedical challenges and drive healthcare innovation.

In his research, Prof Eyras uses computational tools to study RNA and its role in cancer. His research focuses on developing new technologies to improve cancer treatments, understanding how cells change and resist therapy, and enhancing the analysis of genetic data for medicine and research. With more than 43,000 citations, his work is widely recognised.

A passionate advocate for knowledge-sharing, Prof Eyras actively contributes to EMBL Australia training programs and recently spoke at the 5th EMBL Partnership Conference on 'AI in One Health'.

See Prof Eyras' highlight publications ↗

Australian National University

Addressing gaps in imaging training

ADVANCED IMAGING TRAINING

In 2023, EMBL Australia developed a specialised training event in response to the growing demand for expertise in **light-sheet microscopy**, bringing together more than 50 participants from the Australian imaging community for a three-day workshop at Monash University.

Titled 'Beyond Imaging: Visualisation, analysis & inference', the workshop offered training in data management, analysis and interpretation through biophysical modelling.

By addressing this niche, EMBL Australia was able to fill a gap in available training, equipping researchers with the skills needed for advanced imaging techniques.

Led by EMBL Australia group leader **Senthil Arumugam** (Monash University), along with other experts in the field - **Srigokul Upadhyayula** (University of California, Berkeley), **Kishan Dholahkia** (University of Adelaide), **Christian Tischer** (EMBL Heidelberg) and **Josh Moore** (openmicroscopy.org) - the event provided valuable insights and hands-on experience in a rapidly developing field, while also strengthening connections within the local and international research communities.

Pioneering Cryo-EM training in Australia

ADVANCED IMAGING TRAINING

In May 2024, EMBL Australia held a pioneering week-long training course titled 'Freeze, Frame and Focus: Mastering Cryo-Electron Tomography', providing a blend of lectures and practical training in both microscopy and data processing.

This was the first hands-on course in Australia solely dedicated to **cryo-electron tomography** (cryo-ET) and aimed to foster a vibrant research community around this cutting-edge technology. The course was designed to equip participants with essential skills in cryo-EM, an advanced imaging technique used to study biological samples at molecular resolution.

Led by **Georg Ramm** (Monash University), along with international experts **Jan Ellenberg** (EMBL Imaging Centre), **Ellen Zhong** (Princeton University) and **Rado Danev** (University of Tokyo), the course offered invaluable insights and hands-on experience, contributing to the advancement of cryo-ET in Australia.

Through this initiative, EMBL Australia continued to strengthen its commitment to providing world-class training and building expertise in specialised imaging technologies, ultimately supporting the growth of the national and international research community.

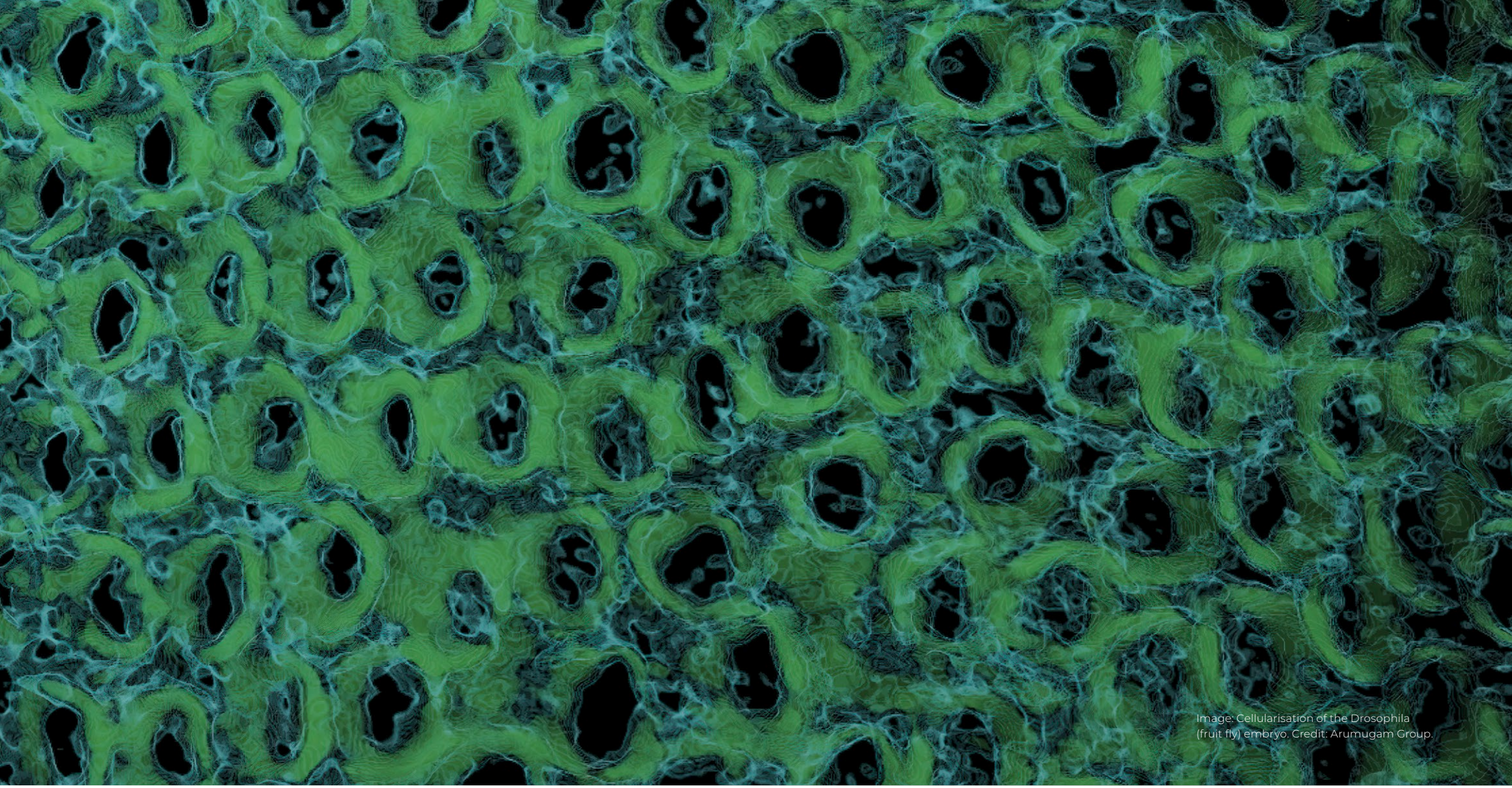


Image: Cellularisation of the Drosophila (fruit fly) embryo. Credit: Arumugam Group.

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NCRIS National Research Infrastructure for Australia
An Australian Government Initiative

EMBL Australia collaborates with the South Australian immunoGENomics Cancer Institute, University of New South Wales, Australian National University, Garvan Institute of Medical Research, Burnet Institute and Monash University. The EMBL Australia Secretariat is hosted by the Monash Biomedicine Discovery Institute (BDI), Monash University.

EMBL Australia