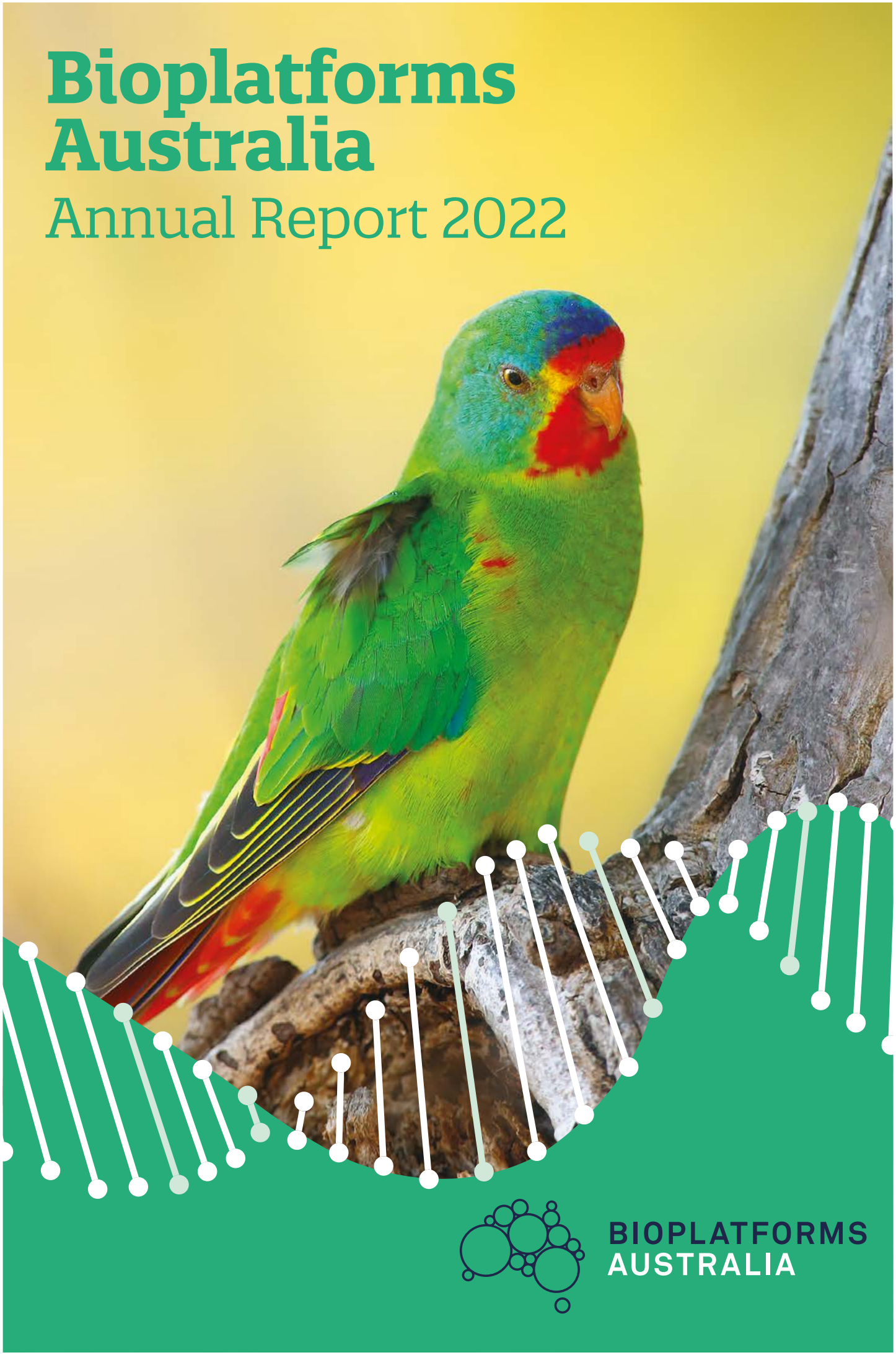
Bioplatforms Australia

Annual Report 2022



BIOPLATFORMS AUSTRALIA

Partners

NCRIS National Research Infrastructure for Australia — An Australian Government Initiative

ACT Government

NSW Government

Queensland Government

Government of South Australia

Government of Western Australia

Macquarie University — Sydney · Australia

The University of Melbourne

UNSW Sydney

Monash University

The University of Western Australia

Australian National University — The John Curtin School of Medical Research

University of South Australia

The University Of Queensland — Australia

AWRI Australian Wine Research Institute

SAHMRI South Australian Health & Medical Research Institute

agrf

Garvan Institute of Medical Research

Leadership

Bioplatforms Australia is committed to maintaining a high standard of governance and leadership. Strategic direction and operational oversight is provided by an independent Board of Directors and supported by an Executive Management Committee who advise on platform technologies and organisational initiatives.

Board Members and Responsibilities

Bioplatforms Australia's Directors offer a wealth of experience across scientific, business and government domains. Each Director has responsibility for particular aspects of organisational strategy in addition to their fiduciary duties.

Dr Leslie Trudzik – Chairman
Prof Sue Meek – Director
Dr Katherine Woodthorpe – Director
Professor Peter Gray – Director

Executive Management Committee

The Executive Management Committee manages and advises on platform issues and operations. It is also responsible for implementing strategic initiatives, including Commonwealth funding agreements established with network partners. The committee is comprised of the Chief Executive and scientific leaders from across the Bioplatforms network.

Committee members are:

Chair
Andrew Gilbert, Chief Executive, Bioplatforms Australia

Professor Marc Wilkins
Professor Malcolm McConville
Professor Andrew Lonie

PHOTOGRAPHY CREDITS
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Bioplatforms:
Integrated and collaborative impact

Central to the 2021/22 financial year was the publication of the Australian Government Department of Education National 2021 Research Infrastructure Roadmap. This and its predecessors have provided the critical guiding policy for Bioplatforms NCRIS investment since our establishment in 2007 and I would like to commend the Department of Education research infrastructure team, together with the work of the Expert Working Group, in providing such a strong foundation for research infrastructure for the next five years. Resolving the complexity of research infrastructures, and their deployment to key national challenges, and doing so with a focus on a very uncertain future was well addressed in the Roadmap.

New Infrastructure Investment

While still subject to the effects of COVID-19 constraints, Bioplatforms took steps throughout 2021/22 to ensure our network of enabling laboratories continued to provide the cutting-edge capability and capacity required to support Australia's research agenda. We added significant genomic sequencing capacity, enhanced our genomic resolution with new investment in a spatial transcriptomics network, and upgraded our national mass spectrometry suite in support of proteomics and metabolomics analytic capabilities. Additional resources were also provided for a national human genomics data sharing capability aimed at underpinning a number of precision medicine initiatives. The collective investments made, position Bioplatforms with a technology currency ready to embark on the path described in the national research infrastructure roadmap and support Australia's scientific endeavour to meet a breadth of national research challenges.

The 2021/22 year also saw Bioplatforms first investments in a national Synthetic Biology capability, through the support of complementary facilities at Macquarie University and The University of Queensland providing the dual functions of high-throughput and high-resolution bio-engineering. Whilst this manifests the first NCRIS supported investments in Synthetic Biology, the prominence of the capability within the 2021 Roadmap provides significant opportunity for step-change growth of the network in benefit of Australia's biotechnology industry.

Bioplatforms Facility Contribution

Bioplatforms is committed to supporting the Australian life sciences community through a diverse access program, provision of targeted infrastructure requirements, and making integrated capability available to initiatives that are of significant breadth, scale and complexity, in a way that is not readily achievable through other mechanisms. In 2021/22, the Bioplatforms network undertook 20,300 contracts for 3,000 discrete collaborators, from which 25% of activity was focused on industrial and commercial research communities.

Bioplatforms investments in 'Omics and Synthetic Biology research infrastructure provide avenues for broad impact in areas of significance to Australia, indicated by our access breakdown with 60% from the biomedical sector, 20% focused on food and agricultural research with the final significant focus being biodiversity and environmental research. The publications supported now exceed 900, indicative of the systematic value the Bioplatforms network brings the Australian research system.

Strategic Research Partnership

Bioplatforms purposefully seeks to support the discovery-to-impact cycle within the innovation system though advanced partnership strategies that require contributions from multiple scientific disciplines. Towards this end, Bioplatforms partners extensively to drive convergence with other researchers, scientific capabilities, partnering and businesses, and financial investors, thereby providing a vibrant ecosystem for innovation and application.

An example of our partnership approach included the formation and early deployment of an integrated NCRIS Health Group comprising leadership from Population Health Research Network, Phenomics Australia, National Imaging Facility, Therapeutic Innovation Australia and Bioplatforms Australia. The purpose of the cluster is to support significant Australian research agendas deliberatively and seamlessly with harmonious access to the cross section of health directed NCRIS capabilities. To this end a number of organisations have made joint appointments, and we have collaboratively supported a number of MRFF grant proposals within a joint Memorandum of Understanding.

Another example is the ongoing collaborative work of the Bioplatforms framework data strategy, which has continued to deliver new initiatives in areas such as Australia's food and beverage sectors, including biosecurity surrounding agricultural pathogen risks. Working with Rural Development Corporations, State Departments of Primary Industry, CSIRO and the university sector, Bioplatforms is developing a broad-based reference library of pathogen genomes to support enhanced biosecurity, on farm surveillance and avenues for novel agronomic intervention.

A highly effective team

The achievements of the 2021/22 year as sketched out above have been made possible only through the efforts and commitment of many hundreds of people in the Bioplatforms network. I would like to thank all involved, and particularly acknowledge the contributions of the platform Convenors, Professor Marc Wilkins, Professor Malcolm McConville and Professor Andrew Lonie. Collectively, and individually, our Convenors have played a significant role in engaging broad research communities, providing advice to the Board, supporting our Executive and acting as the wider face of Bioplatforms throughout a national network comprising Universities, Medical Research Institutes, Publicly Funded Research Agencies, Industry bodies, and State and Territory government funded research initiatives.

I am also indebted to my fellow Directors, Dr Sue Meek, Dr Katherine Woodthorpe and Professor Peter Gray for their energy, insights and thoughtful guidance throughout such a critical time. Their blend of experience and expertise has been instrumental in all our decision making.

Finally, and most importantly, the contribution of the Company Executive, Andrew Gilbert and his small yet high achieving team, has been central to our accomplishments throughout the year, and to the aspirational plans that these now permit.

Dr Les Trudzik
Chairman

Capability

19
world-class facilities, including **2** biofoundries

$25m
invested in best of breed technology and leading expertise

331
funded staff (**279** full time employees)

Digital Infrastructure (BioCommons)

18
Bioinformatics training sessions (BioCommons, face-to-face and webinar)

3,415
training attendees (**24%** live, **76%** recorded)

Galaxy Australia activities
– **893** active users per quarter (average)
– **2,352** analytical tools available

Initiatives & Collaborations

15
active National initiatives

Partner Organisation to **3** existing ARC Centres of Excellence and **3** planned Centres
(ARC decision pending)

1,194
registered users (**209** new) to the Bioplatforms Data Portal across **13** initiatives datasets

Scientific outcomes of technology platform nodes

923
research papers published in peer-reviewed journals

Publications in top 10% journals including Nature, Science and PNAS

>175
ARC and NHMRC grants Chief Investigator, partner investigator/ organisation

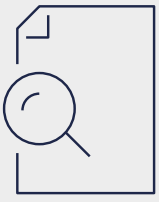
Network access

Effective results driven research requires a critical mass of expertise and state-of-the-art infrastructure for the Australian life sciences sector.

2,947
CLIENTS

71%
CLIENTS EXTERNAL TO FACILITY HOST ORGANISATION

20,335
CONTRACTS



923
PEER REVIEWED PUBLICATIONS

Through Bioplatforms' infrastructure and personnel investment, we ensure highly skilled researchers have access to world-class technology platforms in Genomics, Proteomics and Metabolomics with integrated Bioinformatics capabilities.

The life sciences sector is transforming with increased focus on data-enabled approaches to modern day complex biological challenges. To ensure an ongoing state-of-the-art capability across the research sector, Bioplatforms has consolidated our diverse platforms and technology capabilities into 'critical mass' Centres, each with specialised functions. The demand in our 'omics capabilities continues to grow. The completed contracts have led to impacts across all four capabilities (Genomics, Proteomics, Metabolomics, Bioinformatics).

We support the breadth of the Australian research community through our diverse client base. Research contracts completed were distributed proportionally across clients and sectors, with repeat business averaging 7 contracts per client over the year, indicative of the value of Bioplatforms facilities to researchers. This year has seen an increase in industry clients as well as a stronger focus in Agri-food related works.

ENABLING LABORATORY ACCESS

Clients

25% Government and industry

19% Medical research institutes & PFRA

56% University

Research focus

22% Agri-food

24% Environmental

55% Biomedical and diagnostics

SYNTHETIC BIOLOGY

Biofoundries

$8.3m towards a national synthetic biology infrastructure capability

ARC Centre of Excellence

$35m ARC investment

32 partner organisations

Spin-off and start-ups

HydGene Renewables

Number 8 Bio

BIO INFORMATICS

Galaxy Australia

2,352 tools available (**1,029** added in 2021-22)

893 active users per yearly quarter (average)

Biocommons

18 training events held

3,415 attendees

NATIONAL FRAMEWORK INITIATIVES

15 active National initiatives

5,828 projects generating omics datasets

90 reference genomes of native Australian species to date

>10,000 environmental samples with microbial genomic resource

45 population genomics studies conducted in support of conservation efforts

PARTNERSHIP DEVELOPMENT

2 Cooperative Research Centres

2 National Environmental Science Program hubs

7 ARC Centres of Excellence

4 Industry transformation research hubs and training centres

Supported all ARC and NHMRC schemes (research projects, fellowship, industry collaboration, centres of research excellence)

31 Commercially-linked activities (patents, clinical trials, startups)

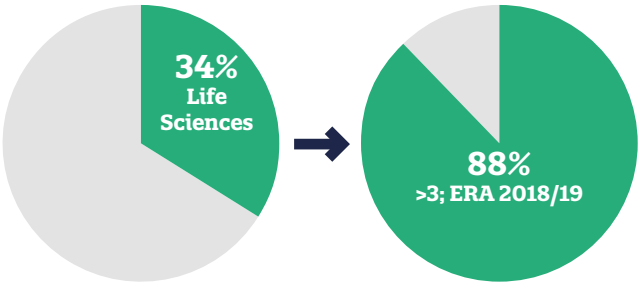
>300 collaborative engagements with domestic and international partners (such as MoUs, contracts)

Bioplatforms Australia

Australia's capacity to maintain world-class research outputs essential for innovation largely depends upon the availability of a highly skilled workforce and access to cutting-edge research infrastructure platforms. Future research success and application will increasingly be complex and multidisciplinary, beyond the singular involvement of any one party and deliberate partnership strategies will be required.

Demand

The Life Sciences sector, incorporating Technology, Biological Sciences; Agri-food and Veterinary Sciences; Biotechnology and Medical and Health sciences collectively, represent approximately 34% of the national research output with approximately 88% rated at or above world standard (>3; ERA 2018/19). In support of this evidence, 3 of 10 ARC Centres of Excellence awarded in 2020 included Bioplatforms as a partner organisation. Furthermore, approximately 30% of ARC Discovery projects awarded in 2020 were in support of research requiring 'omics capability.



Deployment

Bioplatforms has a successful history of prioritising key national research agendas and deploying the national asset of genomics, proteomics and metabolomics through deep collaboration to energise research, build re-usable data resources and enable open science of scale and diversity. Combined with support of peak peer reviewed research collaborations through the ARC Centre of Excellence program and MRFF Missions, Bioplatforms has proactively deployed NCRIS capability and fostered persevering collaborations across biomedicine, agriculture and environmental research communities.

Digitisation of Discipline

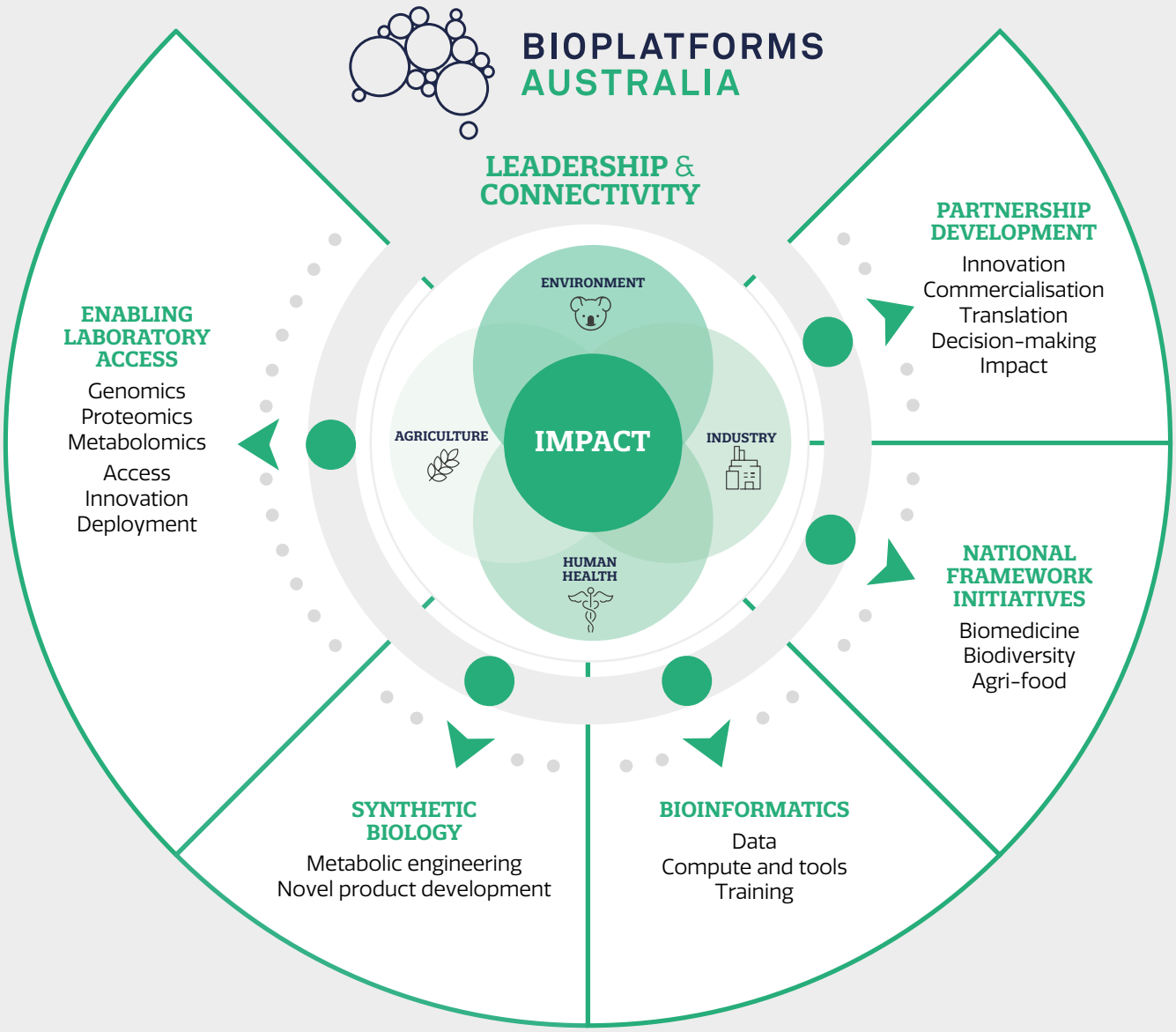
The 'omics have become data -centric digital sciences demanding of investment in computing power, data storage and management, software development and deployment and a differential expertise not traditionally identified with the biological sciences. The Australian BioCommons represents Bioplatforms' response to this digital transition and addresses a number of pressing infrastructural needs, including supporting naïve adoption of bioinformatics through the Galaxy cloud offering; leading a national consortium in human genomics attempting to harmonise approaches and promote data sharing locally and globally, and the synthesis of that aggregate data for new science; and coordinating Australia's national digital providers (NCI, Pawsey, AARNet, AAF, ARDC) in their support for increasingly complex Life Sciences requirements.

Evolving Strategy

Bioplatforms is committed to supporting the Australian life sciences community through provision of targeted infrastructure requirements and making integrated capability available to initiatives of breadth, scale and complexity in a way that is not readily achievable through other mechanisms.

Bioplatforms supports the current research lifecycle through deep sector engagement with research communities, and is aligned with national strategic research initiatives such as future gene and cell therapies, precision medicine, food security and quality. Existing capabilities in data production, informatics, as well as human capital in the form of skills and training, and research communities, have ensured Bioplatforms can deeply support many touch points in a researcher's impact journey.

We deliberately seek to support the discovery to impact cycle within the innovation system through an advanced partnership strategy. The innovation cycle typically involves a myriad of inputs, including contributions by more than one scientific discipline. We recognise extensive partnership and convergence of capabilities with our NCRIS peers is critical to enabling a vibrant national innovation ecosystem.


BIOPLATFORMS AUSTRALIA
LEADERSHIP & CONNECTIVITY
ENABLING LABORATORY ACCESS
Genomics
Proteomics
Metabolomics
Access
Innovation
Deployment
PARTNERSHIP DEVELOPMENT
Innovation
Commercialisation
Translation
Decision-making
Impact
NATIONAL FRAMEWORK INITIATIVES
Biomedicine
Biodiversity
Agri-food
BIOINFORMATICS
Data
Compute and tools
Training
SYNTHETIC BIOLOGY
Metabolic engineering
Novel product development
ENVIRONMENT
AGRICULTURE
IMPACT
INDUSTRY
HUMAN HEALTH

SYNTHETIC BIOLOGY PROGRAM

NCRIS 2021 Synthetic Biology Investment

In 2020, the federal government, through NCRIS, provided a seed investment of $8.3, towards a Synthetic Biology infrastructure for Australia. Bioplatforms assisted with the implementation plan to create a vibrant, accessible research environment for academic pursuit as well as an enabler for start-up companies and contributor to the bioeconomy ecosystem.

Synthetic biology is characterised by a high throughput, cyclic workflow based on the engineering paradigm of DESIGN-BUILD-TEST-LEARN in a facility termed a Biofoundry. The first seed investment in SynBio infrastructure is an integrated model for a national Biofoundry capability with complementary nodes at Macquarie University and The University of Queensland. The key considerations for the recommendations include:

- active integration and development of existing expertise to prevent unnecessary duplication
- growth of a critical mass in the skills and expertise required for modern, competitive complex biology
- provision of a conduit between academic excellence and a vibrant start-up and industrial ecosystem
- linkage of activities at several existing NCRIS supported facilities to enhanced capability at specific institutional laboratories to deliver an integrated Biofoundry at the national level

This new infrastructure aligns with more recent initiatives related to pilot scale fermentation (QUT and Mackay), State and Commonwealth mRNA manufacturing initiatives, Gene and Cell therapy initiatives (QLD, NSW and Vic), and the adoption of gene technologies in agriculture (QAFFI, NSW DPI) that address the synthetic biology innovation pipeline.

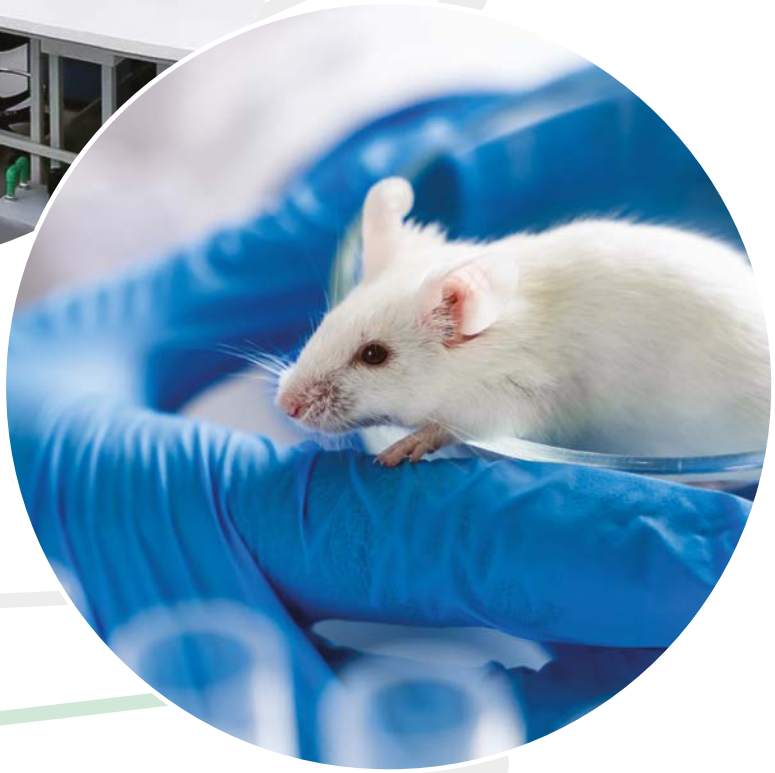
Further investment will be conducted through collaborative and activities-based programs, such as framework initiatives on data architectures with machine learning preparedness; demonstrative of the BioFoundry capability; supporting translation of innovations borne from the Australian synthetic biology capability.

The Australian Genome Foundry at Macquarie University

The foundry was established to participate in the global collaboration in the Yeast 2.0 project led by John Hopkins University and has become a hub of activity for the ARC Centre of Excellence in Synthetic Biology, its partners and several start-ups including HydGene, Number 8 Bio, Bondi BioWorks and Nourish. The pipelines include construct design and assembly, HTP strain engineering, strain screening and product measurement and characterisation. The high-throughput strain engineering and chromosome building capability will feed directly to the UQ AIBN facility for microbial engineering as well as plant and mammalian researchers more broadly who require specialised DNA constructs.

The University of Queensland Australian Institute for Bioengineering and Nanotechnology IDEA Bio facility

IDEA Bio is a consolidation of metabolomics and proteomics capability with a specialised focus on industrial biotechnology and synthetic biology. AIBN has developed systems biology pipelines for some of the world's leading synthetic biology companies, including Zoetis, ThermoFisher, CSL, Amyris, LanzaTech and Dow and emerging Australian SynBio companies such as Bondi Bio, Servatus, SOSBio. The pipelines explore fermentation and omics data using genome scale models to identify targets for engineering. The targets identified have translated into 100s of million dollars in increased profit, in new processes for chemicals production (successfully piloted at 10,000 litre scale), and a number of patents. Through the UQ AIBN facility, the Australian SynBio community will have access to some of the best systems metabolic engineering pipelines in the world. The facility can serve any foundry in Australia and will work closely with the Australian Genome Foundry and Industrial Biofoundries.



Modelling molecular mechanisms and physiology of prostate cancer

Prostate cancer is the most commonly diagnosed malignancy and the third largest cause of cancer deaths. Genome-wide association studies have identified variants associated with prostate cancer susceptibility, however, mechanistic and functional validation of these mutations are lacking. Mitochondrial energy metabolism plays an important role in the onset and development of cancer. A missense variant was identified in the *ELAC2* gene, which encodes a dually localised nuclear and mitochondrial RNA processing enzyme, with predicted impact on metabolism and tumorigenesis.

The Queensland Metabolomics and Proteomics (Q-MAP) in collaboration with the University of Western Australia and ARC CoE in Synthetic Biology, used CRISPR/Cas9 genome editing to introduce the identified missense variant into the mouse *ELAC2* gene as well as to generate a prostate-specific gene knockout of *ELAC2*. The mutations caused enlargement and inflammation of the prostate and nodule formation. Multi-omic profiling revealed defects in RNA and energy metabolism that activated proinflammatory and tumorigenic pathways.

The systems biology analyses revealed a miRNA-mediated molecular mechanism by which specific non-coding RNAs elicit metabolic changes that drive prostate tumorigenesis. The team concluded that this *ELAC2* variant is a predisposing factor for prostate cancer.

FEATURE STORIES

The Plant Protein Atlas initiative

Global food systems will need to almost double their yield in order to feed the expected global population in 2050 - demand for meat alone is projected to rise by 73 percent in response to growing population and increased protein demand across developed and developing countries.

Global food systems will need to almost double their yield in order to feed the expected global population in 2050. Demand for meat alone is projected to rise by 73% in response to growing population, and increased protein demand across developed and developing countries. The production of healthy and sustainable alternative proteins, such as those from pulse crops need to be increased substantially to meet this challenge and to address concerns around environmental sustainability. The Australian plant protein market is estimated to be valued at $18 billion by 2032 through an expansion of pulse seed production and the development of a secondary plant protein manufacturing industry capable of delivering plant protein foods and ingredients to domestic and international customers.

In Australia, interest in growing pulses continues to rise, with a total of 1.96 million hectares of key pulses including chickpea, lentil, fava bean, field pea and lupin grown across key agroecological zones. These pulses are typically grown in rotation with higher-value cereal crops, and are then sold off cheaply as stockfeed or exported in bulk to India and China, as staple foods. Advancing the current market trade of pulses as commodities to value-added products including protein concentrate, starch and fibre presents a considerable economic opportunity for Australia.

Key knowledge gaps to enable the development of an Australian plant protein pipeline that would underpin the long-term sustainability and profitability of pulses grown in Australia have been identified. These include characterising the relationship between yield and seed quality for target pulse crops; assessing variability in protein content and seed composition across regions, paddocks and within paddocks; and profiling the impact of key environmental constraints such as frost, heat, terminal drought and soil limitation on seed quality.

Bioplatforms, in collaboration with the NCRIS-enabled Australian Plant Phenomics Facility (APPF), established a pilot program to target key omics analyses, including genomics, proteomics, metabolomics and phenomics, which aims to:

- Facilitate fundamental research through the creation of a referential multi omics data resource of selected pulse varieties and how desirable traits vary over time, space, and different environmental conditions. This resource will guide and support progress in genetic and agronomy research towards the optimisation of pulse crops for protein harvest and processing; and
- Provide a proof-of-concept to showcase development of a complementary set of resources, termed 'Atlases'. This framework could be used as a model for other industries that aim to translate traditional outputs toward specific value-add opportunities;
- Bolster a national network of stakeholders from government, researchers, growers, manufacturers, consumers and health professionals to support an ongoing effort in developing a high-quality Australian plant protein production industry.

This initiative is a first step in developing critical foundational data that will support larger efforts to set forward a $18 billion plant protein industry in Australia based on increased production of pulses and their translation into other value-add components for the plant food sector. Bioplatforms will work closely with our NCRIS peers to ensure the broadest possible technological advancements can be brought to prioritised challenges that extend across the grain production (i.e., improved quality) and protein supply chain.

A national stocktake of genomics assets

Biodiversity and Agriculture is measured, monitored and managed at three key levels: 1) ecosystems – habitat, 2) species, and 3) genes.

Biodiversity and Agriculture is measured, monitored and managed at three key levels: 1) ecosystems – habitat, 2) species, and 3) genes. Australia has leaders and data aggregators for ecosystems (via TERN and IMOS) and species (via the Atlas of Living Australia), yet lacks a consolidated resource for Australian native flora, fauna and fungal genetic assets (physical and digital), and a hub that enables the discovery, access and use of genomic data.

At the moment Australia's genomic data for our flora, fauna and fungi species can reside across numerous international data repositories, museums or research labs, making it difficult to find, access and compare genomic data within and across different Australian species. Some genomics resources generated and stored using old technology are no longer easily findable or accessible, decreasing the usability of valuable data or resulting in potential loss of data. The importance of these data resources is highlighted through our national responsibility to protect and preserve Australian native flora, flora and fungi, particularly through enhancing our understanding of ecosystem resilience, bushfire recovery and habitat restoration.

To help address this challenge, Bioplatforms, in collaboration with the ALA, the Australian BioCommons and the ARDC, are developing an Australian Reference Genome Atlas (ARGA).

ARGA
Australian Reference Genome Atlas

The atlas will enhance Australia's scientific data discovery and impact through a connected and trusted discovery portal for genomics knowledge for both biodiversity and agriculture, achieved by facilitating:

- **Broad discovery and access** – via a metadata management system that enables the broad discovery and access of genomics resources for Australian species, no matter the location of the data or specimen;
- **Analysis for collaboration** – via integrated and authenticated access to genomic tools of significance, for example tools/workflows in Galaxy, Apollo genome browser for collaborative annotations;
- **Knowledge sharing** – via community-derived resources that provide curated summaries to knowledge along the genomics data pipeline (from sample collection and storage to genome annotation and submissions to repositories);
- **Value-add connections** – via automated connections to other data repositories/services that value-add to genomic data such as automated connections to ALA occurrence records or links to phenomics resources for key agricultural crops.

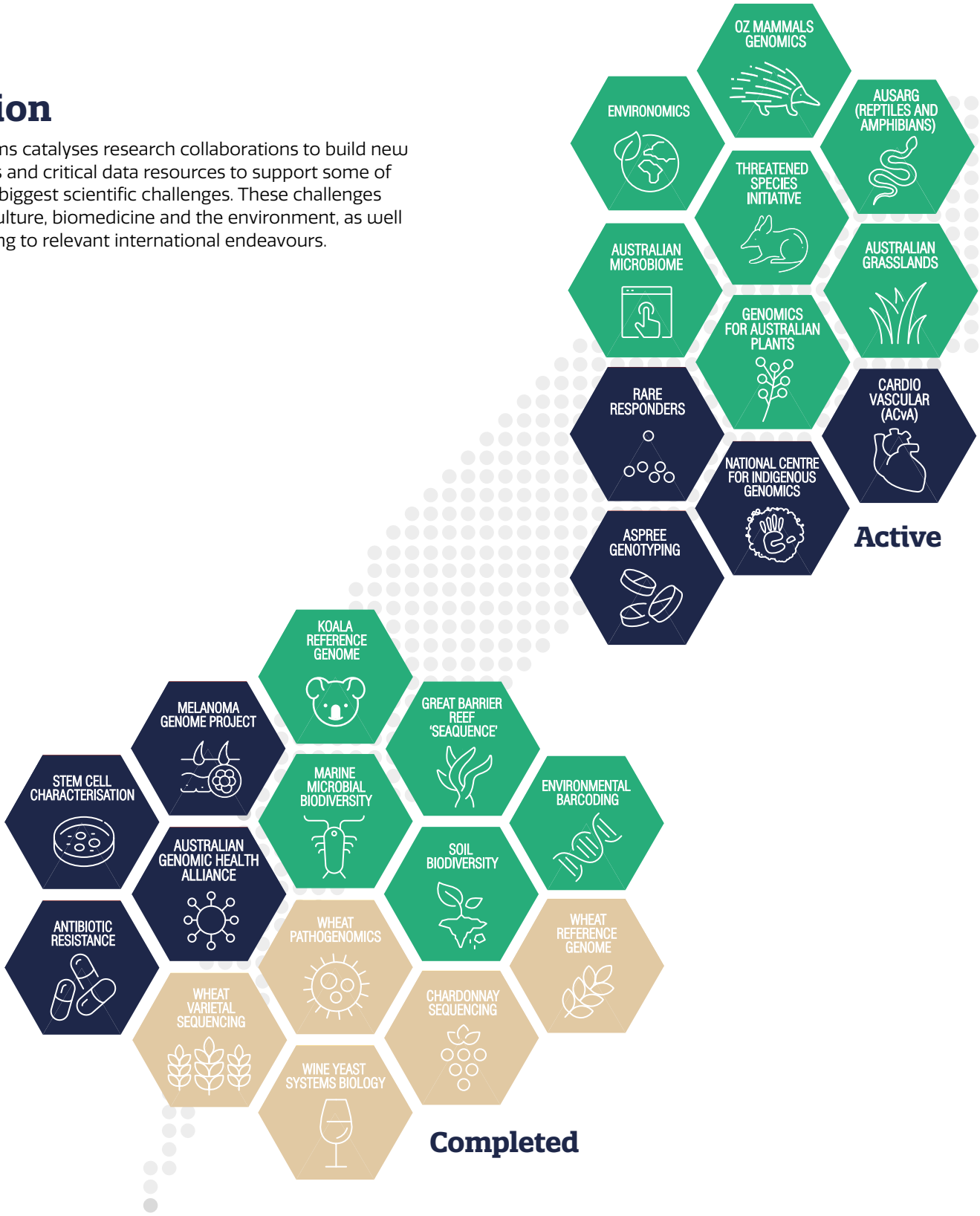
As a first steps towards building the ARGA, a stocktake is being undertaken to understand the public sources for existing data, key formats of datasets, minimum metadata standards, and knowing how much data is published publicly versus that stored offline. This stocktake will help build the foundational framework to index content into the atlas.

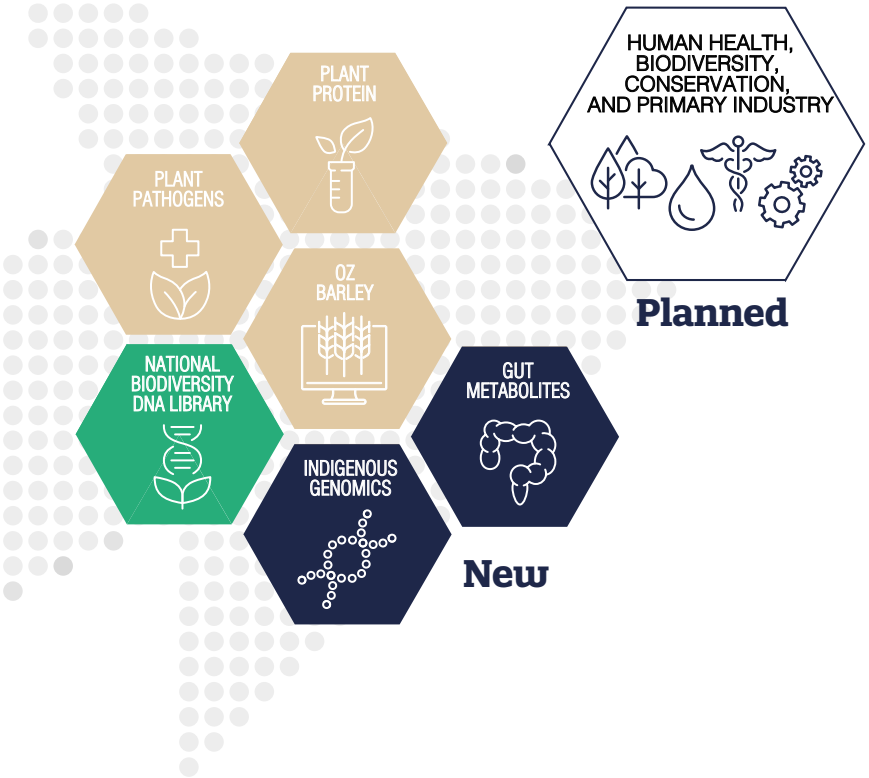
ARGA will pave the way for paradigm-shifting breakthroughs by providing a reliable index of genomic data that will both save researchers valuable time and ensure discoverability and usability of Australian reference genomic data. This resource will enable innovative research that goes beyond the genes of a single species such as comparative genomics and will lead to new insights into our unique Australian species as well as improving the productivity of agricultural crops and health of animals, pointing to new strategies for conserving rare and endangered species.

RESEARCH PROGRAMS

Mission

Bioplatforms catalyses research collaborations to build new capabilities and critical data resources to support some of Australia's biggest scientific challenges. These challenges span agriculture, biomedicine and the environment, as well as extending to relevant international endeavours.





Overview and Projects

Bioplatforms' Initiatives are national collaborative projects that use integrated 'omics infrastructure to support research themes of national significance. The interdisciplinary and collaborative nature of these projects ensures the datasets are relevant to current scientific questions and immediately employed for high impact research.

Over the lifespan of the Program, 29 initiatives have received investment for research integrating genomics, proteomics and metabolomics. The 2021–22 year saw 3 new programs initiated: the Plant proteins atlas initiative, the Indigenous genomics network, and the National Biodiversity DNA Library with CSIRO.

Additional programs are being scoped for future Framework Initiative investment, with continued focus on primary industry and innovation, as well as the completion of the establishment of genetic resources for all Australian flora, fauna taxonomic groups.

The benefits of framework programs

- Build large-scale data resources
- Maximise impact of national research infrastructure
- Build scientific capabilities
- Catalyse scientific collaboration and international linkages
- Research acceleration and translation into industry

NATIONAL INITIATIVES

The Threatened Species Initiative

Conservation of the Swan Galaxias

The Swan galaxias (*Galaxias fontanus*) is an endangered freshwater fish with a severely fragmented distribution in headwater streams of two Tasmanian watersheds. Population connectivity is restricted by the downstream presence of introduced fish species. To secure the few remaining natural populations Swan galaxias have been translocated to several fish-free streams. With the support of the Threatened Species Initiative, Bruce Deagle (CSIRO) with biologists from Inland Fisheries Service Tasmania and collaborators from the University of Tasmania (Dr Burridge), generated a reference genome for the species and provided the first assessment of genetic diversity in natural populations. They also evaluated how well diversity is preserved in translocated populations.

The team found high level of genetic differentiation between fish populations in the two watersheds and variable amount of genetic variation in each population, highlighting limited historical connections between most of the sites studied. The maintenance of genetic diversity is an important factor influencing long-term survival of a species. The project allowed the drafting of specific conservation genetic recommendations that will now be considered as part of a new initiative to establish further population to reduce extinction risk. From the perspective of maintaining genetic diversity in Swan galaxias, the priority populations for future translocations were identified as Dairy Creek (South Esk) and Duke River (Swan). New populations formed by mixing fish from multiple sources within a watershed could be considered to maximise genetic diversity. The low diversity in Cygnet River (translocated Swan Tributary population) could be increased by supplementing with fish from Dukes River (although the long-term viability of the Cygnet population needs to be assessed considering the recent colonisation by climbing galaxias). Whichever populations are used in translocations the exact location of source populations should be recorded as there is considerable variation even within watersheds.

The Plant pathogens initiative

Global food systems will need to double their yield in order to feed the expected global population in 2050. As a major food producer and exporter of about 70% of agricultural production, Australia has a meaningful role in helping to meet this demand. Plant disease caused by plant pathogenic organisms attribute to major limitations in food production globally. Plant diseases cost Australia millions of dollars each year as they reduce productivity, increase the cost of production, and impact on our ability to trade both locally and internationally. Additionally, they adversely threaten our native habitats, biodiversity and ecosystem structure. Maintaining Australia's reputation of a supplier of pest- and disease-free produce is also critical for market access, and provides new opportunities for Australian exports. With the average temperatures rising and an intensification in the incidence of severe weather events, experts anticipate emergence of new pathogens and increased risks in the extent and severity of pest and disease outbreaks.

As such, preparedness and awareness are a national priority, and enabling data-driven decision making is essential. Researchers and industry stakeholders across Australia, and internationally, are already integrating 'omics data into developing resistant varieties, chemical and biological controls, and biosecurity surveillance programs. Yet, correct identification of plant pathogens and progress to develop diagnostic markers is impeded by large gaps in the referential data that is available, particularly over space and time, and existing data can be difficult and time consuming to find and access.

The Plant Pathogen 'Omics Initiative was established through collaborations with the national plant pathology and plant biosecurity community with the aim to generate high quality molecular reference data for key plant pathogens including plant viruses, bacteria, fungi, oomycetes and nematodes threatening Australia's crop, grains, pulses and horticulture industries. The foundational data asset from this initiative will support

- fundamental research and development in plant protection (e.g., understanding emergence and evolution of pathogens in crop systems, resolving taxonomy and race structure, informing biocide development);
- an effective national biosecurity surveillance system (e.g., incursion detection, rapid diagnostics test)

A first round of Request for Partnership was opened in the second quarter of 2022, attracting a broad range of submissions for the establishment of referential genomic data of pathogens from viruses to fungi across Australian crop types.

Supported programs

The Indigenous Genomics Network

The Medical Research Future Fund (MRFF) Genomics Health Futures Mission is currently investing in Indigenous-led research to tackle health issues facing Aboriginal and Torres Strait Islander people. The mission will provide $160 million from 2018–19 to 2028–29 to programs that improve the health of Aboriginal and Torres Strait Islander people through 1) Indigenous-led research practice and governance; 2) knowledge translation; and 3) evidence-based structural change in Aboriginal and Torres Strait Islander health practice.

Bioplatforms is supporting this initiative to establish a National Indigenous Genomics Network that synergistically builds and extends Indigenous leadership in genomic science, research, precision health care, data sciences, ethics and Indigenous knowledge systems to deliver benefit and ultimately reduce health inequality among Australia's First Peoples. The outcomes of this initiative will be central to improving the benefits of clinical genetic services to Indigenous peoples by creating the infrastructure and systems to ameliorate information exchange and linkage between researchers, clinical genetic services and the rest of the health system.

Collaborations and partnerships

Our collaborations and partnerships for 2021/22:

International

ELIXIR (Europe)
Joint Genome Institute (USA)
National Microbiome Data Collective (USA)
Royal Botanic Gardens, Kew (UK)
National History Museum (UK)
Earth BioGenome Project (Multinational)
European Molecular Biology Laboratory (Europe)

Commercial/ industry partners

HydGene Renewables
– Biological hydrogen production
Coopers Brewery
– biofouling and fermentation improvements
Number 8 Bio
– reducing methane emissions
PYC Therapeutics and Lions Eye Institute (Proteomics International)
CSL Ltd. (UniSA Proteomics)

Biomedical Research Future Fund (BRFF)

Cardiovascular Health Mission
Frontier Health and Medical Research Initiative
Genomics Health Futures Mission
NHMRC Centre of Research Excellence for Better Outcomes in Coronary Artery Disease
NCRIS Health Group

ARC Industry Transformation Research Hub (ITRH) and Training Centre (ITTC)

Centre for Medicinal Agriculture
Research Hub for Sustainable Crop Protection
Research Hub for Supercharging Tropical Aquaculture through Genetic Solutions
Centre for Facilitated Advancement of Australia's Bioactives
Centre for Accelerated Future Crop Development
Centre for Next-Gen Technologies in Biomedical Analysis

Impact through collaboration

Bioplatforms has ongoing partnerships with Cooperative Research Centres, Australian Research Council (ARC) Centres of Excellence, and ARC Industry Transformation Research Hubs. We also collaborate closely on national programs and have strong links with international partners.

These national and international partnerships are central to delivering on our core values and beliefs – building impact, quality, collaboration and trust.

Programs

Synthetic Biology
Reef Monitoring
Bioinformatics Training
Australian Reference Genome Atlas (ARGA – ALA)
National Biodiversity DNA Library (NBDL – CSIRO)
Cross-NCRIS projects – OzBarley (ARDC, APPF); Ocean Data Nexus (ARDC, IMOS); Biomedical discovery asset (ARDC, Phenomics Australia)

ARC Centre of Excellence (CoE)

ARC CoE in Nanoscale BioPhotonics (completed)
ARC CoE in Plant Cell Walls (completed)
ARC CoE for Australian Biodiversity and Heritage
ARC CoE in Synthetic Biology
ARC CoE in Plant success in Nature and Agriculture
ARC CoE in Innovations in Peptide and Protein Science

Cooperative Research Centre (CRC)

CRC for Alertness, Safety and Productivity
CRC for Transformations in Mining Economics
CRC for Food Agility (AWRI)
CRC-P Minomic International Ltd

Environment and Biodiversity

National Environmental Science Program (NESP) 2 Hubs
- Resilient Landscapes Hub
- Marine and Coastal Hub

NCRIS National Earth and Environmental Facilities Forum (NEESFF)

Commercial and industry engagement

The Bioplatforms infrastructure network is a resource for Australian business and industry. Expertise in life science research and development is relevant across the sectors of health and medicine, agriculture and food, biotechnology and waste.

The Bioplatforms infrastructure network is a resource for Australian business and industry. Expertise in life science research and development is relevant across the sectors of health and medicine, agriculture and food, biotechnology and waste. Our facilities are available for outsourced product development and for more collaborative research and development. We commonly perform industry led projects, partnerships on grant opportunities and broker relationships for constructive collaborations with the research community. Bioplatforms Australia also provides project management for solutions to industry-identified problems. This approach ensures we are able to maximise commercial outcomes, deliver targeted research to end user needs, and ensure links with current national scientific and innovation priorities. Industry engagement is a key component of the programs and initiatives that Bioplatforms supports.

Approach

Bioplatforms Australia is exposed to the intersection between academic and applied scientific discovery and believe this is the foundation for an emerging knowledge-based economy. Our Federally funded network is crucial for enabling technologically-heavy start-ups and SMEs to become the Australian bio-industries of the future. We offer various levels of assistance and support to enable innovative ideas to attract further investment.

CASE STUDY 1

ARC TRAINING CENTRE FOR
FUTURE CROPS
DEVELOPMENT

Partnership with industry

The Australian Government Department of Education National 2021 Research Infrastructure Roadmap release this year highlighted the need for NRI to improve engagement with industry and facilitate research translation. Through strategic engagement and partnerships the Bioplatforms node network have markedly increased their industry clients.

Furthermore, Bioplatforms as well as the nodes have established meaningful partnership in industry programs such as the ARC Industrial Transformation Training Centres (Centre for Accelerated Future Crop Development and Centre for Facilitated Advancement of Australia's Bioactives), ARC Industry Transformation Research Hubs (Hub for Sustainable crop protection and Hub for Supercharging tropical aquaculture through genetic solutions), and Cooperative Research Centre (CRC for Transformations in mining economics). This increased engagement is also complemented with active support and facilitation of activities for Australian start-ups.

CASE STUDY 2

Commercialisation workshops

Responding further to the government priorities and a growing desire to enhance translation and commercialisation of Australian research capability, Bioplatforms wants to offer a targeted training and support to its node staff to:

- Increase the level of engagement and partnerships with industry
- Increase awareness and utilisation of Bioplatforms' facilities to catalyse translation and commercialisation of research-intensive projects.

Target collaboration includes:

- Capturing outsourced R&D from industry.
- Catalysing university spin-outs based on research that uses Bioplatforms' facilities.

Bioplatforms worked with Cruxes Innovation to provide an industry engagement and translation workshop. A pilot workshop was held in March 2022 and was attended by 17 node members. This workshop will be followed up by other instalments held around the country to match with demand.

Capabilities network

Scientific research changes lives through innovation.

Bioplatforms Australia encourages innovation by investing in scientific infrastructure and biomolecular research capabilities through our Capabilities Network. This Network spans 19 leading universities and research facilities across Australia, employs 331 staff annually. Our capabilities network is organised into five technology platforms – genomics, proteomics, bioinformatics, metabolomics and synthetic biology.

Our capabilities network is organised into five technology platforms

Genomics

Gene Discovery and Genome Function

- Australian Genome Research Facility
- The Ramaciotti Centre for Genomics, UNSW, NSW
- Biomolecular Resource Facility, ANU, ACT
- Garvan-Weizmann Centre for Cellular Genomics, NSW
- Genomics Western Australia, WA
- South Australian Genomics Centre, SA

Proteomics

Protein Structure and Function

- Australian Proteome Analysis Facility, NSW
- Monash Proteomics & Metabolomics Facility and Monash Antibody Technologies Facility, VIC
- University of South Australia, SA
- Proteomics International and UWA, WA

Bioinformatics

Data acquisition, integration, analysis and modelling

- Australian BioCommons led out of the University of Melbourne
- The Queensland Cyber Infrastructure Foundation (QCIF)

Metabolomics

Small Molecule Analysis

- Bio21 Institute, University of Melbourne, VIC
- Australian Wine Research Institute, SA
- Centre of Metabolomics, UWA, WA
- Australian Institute of Bioengineering and Nanotechnology, UQ, QLD

Synthetic Biology

Design-Build-Test-Learn

- Australian Genome Foundry – Macquarie University, NSW
- IDEA Bio – University of Queensland, QLD

Genomics

The genomics platform is important to every field of life science research and provides cutting-edge genome research services via our state-of-the-art infrastructure and world class specialists with expertise in high throughput genomics, transcriptomics, epigenomics and bioinformatics.

- Australian Genome Research Facility
- Ramaciotti Centre for Genomics
- Biomolecular Resource Facility
- Kinghorn Centre for Clinical Genomics
- Genomics Western Australia
- South Australian Genomics Centre

Monitoring brush-tailed rock-wallabies

Non-invasive monitoring and reintroduction of the brush-tailed rock-wallaby in the Grampians National Park, Australia

Thirty-nine endangered brush-tailed rock-wallabies were reintroduced to the Grampians National Park, western Victoria, between 2008 and 2012. These rock-wallabies struggled to thrive due to high mortality, low breeding, fox predation and physical disturbance during monitoring. As such, the wallabies were left undisturbed between 2014 and 2017 and monitored only by remote camera. In 2019, camera-monitoring and non-invasive genetic monitoring (faecal) were used to identify wallaby members, genetic diversity, and breeding. Camera monitoring in 2019 identified five individuals, whereas genetic monitoring, conducted through AGRF, identified eight individuals. Genetic diversity within the wallaby population was moderate.

Bioplatforms facilities:
Australian Genome Research Facility

Partners: University of Adelaide, Landscape South Australia, Schultz Foundation, Fauna Research Alliance

Outcome: Leaving the colony undisturbed after 2013 correlated with improved adult survival, increased breeding, and successful recruitment of young to the population. Recommendations for the Grampians colony include continuation of regular camera- and faecal genetic monitoring to improve our understanding of the reintroduction biology of wallabies and other marsupials in open, unfenced landscapes.

Impact: This work assessed and showed the effectiveness of wallaby reintroduction into the Grampians National Park using non-disruptive camera and faecal genetic monitoring. This will allow a broader application of this approach and improve conservation of threatened species in Australia.

Diagnosing acute lymphoblastic leukemia

Improvements of diagnostic tools for acute lymphoblastic leukemia

Acute lymphoblastic leukemia (ALL) is characterised by abnormal differentiation and proliferation of malignant lymphoid precursors in blood and bone marrow. Usually, the disease manifests as abnormal proliferation of B-cells while less than a quarter of patients present with a T-cell malignancy. The incidence rate is the highest in children under the age of 10 and in adults over the age of 65 with an average age-adjusted global annual incidence of 0.85 per 100,000 individuals. Despite recent progress in molecular phenotyping, ALL remains a life-threatening disease, and advanced age (beyond paediatric) and certain subtypes are predictive of poor outcomes. There is a compelling rationale for improving diagnostic tools and pursuing deeper biological insight into ALL through new emerging technologies. The project analysed a broad scale of samples from patients located over two continents.

Bioplatforms facilities:
South Australian Genomics Centre

Partners: Professor Deborah White is the Director of the Cancer Program and Deputy Precision Medicine Theme Leader at SAHMRI

Outcome: The work allowed for the identification of 11 ALL subtypes that were present in up to 40% of effected patients. Researchers were able to develop the "Allspice" tool which predicts ALL subtypes and driver genes from mRNA-seq data. Allspice also includes quantitative classification and safety metrics to help determine the most plausible genetic drivers for cases where other findings are inconclusive.

Impact: The use of mRNA sequencing data with the newly developed tool is being used to provide diagnostic information that is often quicker and easier to obtain compared to fusion callers or cytogenetic tests. The resulting information can help oncologists determine the most likely causal drivers with greater confidence and identify potential therapeutic targets in a shorter time frame.

Proteomics

Proteomics is concerned with protein structure and function. Bioplatforms' supported facilities offer a broad range of services including high throughput proteomics, protein biochemistry, monoclonal antibody production, along with drug discovery and screening.

- Australian Proteome Analysis Facility
- Monash University – Monash Proteomics and Metabolomics Facility, Monash Antibody Technologies Facility
- Mass Spectrometry and Proteomics, UniSA
- Proteomics International

Getting to know the causal agent of Dieback

Gene validation and remodelling using proteogenomics of *Phytophthora cinnamomi*, the causal agent of Dieback

Phytophthora cinnamomi is an aggressive soilborne plant pathogen that causes plant death in native vegetation and several horticultural crops and is listed a key threatening process under the Commonwealth Environment Protection and Conservation Act 1999. Once established, management of this pathogen is highly challenging and there is an urgent need to elucidate key aspects of its pathogenicity across its large host range. To perform all downstream work such as the development of detection markers and identification of novel candidates for targeted control, a stronger foundation of the genome annotation is required.

The research partners primary interest was to identify key virulence factors, detection markers, and contributors to chemical resistance.

Bioplatforms facilities:
Proteomics International

Partners: Curtin University; Centre for Phytophthora Science and Management, Murdoch University

Outcome: Through the application of a proteogenomic pipeline, the genome annotation of *P. cinnamomi* was significantly improved.

The produced data not only provided an improved annotation but simultaneously enabled the validation of approximately 3500 currently annotated gene models, giving confidence that this is a strong and high-quality foundational resource for subsequent proteomic and genomic work on the pathogen.

Impact: This project has facilitated current efforts in understanding the infection mechanisms of this pathogen, identifying important virulence factors and detection markers, and unravelling the drivers of chemical resistance. This will lead to improve and inform management of Dieback disease.

Development of stronger rice cultivars

Understanding the varying response of rice cultivars from complex simultaneous abiotic stresses to improve crops

Rice is a diet staple for nearly half of the world's population. With the world's population expected to continue to increase, it is vital to ensure that production remains sustainable with continued challenges of the changing world – including salt, drought and temperature stresses. Proteomics was used to assess responses to multiple stresses to determine cellular responses of two rice cultivars to determine molecular features that may indicate increased stress tolerance.

IAC1131 and Nipponbare are rice genotypes that display different tolerances to environmental stressors. IAC1131 is an upland Brazilian rice line tolerant to erratic water supply, while Nipponbare is a paddy rice that is flood-tolerant, but sensitive to drought and extreme temperature shifts. The assessment of the proteomics differences of these rice help understand how rice varieties develop tolerance for different environmental conditions and will inform development of rice genotypes that are more sustainable and productive.

Bioplatforms facilities:
Australian Proteome Analysis Facility

Partners: Macquarie University

Outcome: Proteomics revealed variations in the number and patterns of differentially expressed proteins within the two rice cultivars. The IAC1131 has higher stress tolerance as the plants could withstand stress for longer before adaptation. However, the increased regulatory changes in Nipponbare may indicate an ability to respond more dynamically. Gene ontology enrichment showed that for both strains protein folding pathways were the most significantly regulated in response to the stress conditions.

Impact: The increased understanding of stress response in rice is the first step to allow researchers to develop hardier, more sustainable crops to ensure food stability for future generations.

Metabolomics

Metabolomics involves large-scale analysis of cell metabolites. Metabolomics is integral to the suite of 'omics technologies required for systems analysis and is often described as the 'glue' that brings multiple 'omics efforts together.

Through our network of metabolomics partner facilities, we provide state-of-the-art metabolomics capabilities and customised services, from specific detection and quantification services, through to complex investigations and systems wide analyses in biological systems.

- University of Western Australia
- Australian Wine Research Institute
- The University of Melbourne
- University of Queensland

Chicken breeding for meat production

The avian maternal environment influence on the physiological mechanisms contributing to progeny production efficiency in chicken meat birds

Advancements in chicken meat production are critical to meet the continually increasing consumer demand. The maternal environment for breeder hens can have a direct impact on post-hatch phenotypes. Metabolomics SA supported this project by establishing protocols for analysis of hormones in chicken plasma and fertilised egg yolk and through PhD student training on the practical and theorical aspects of the analytical techniques adopted.

Researchers at the University of Adelaide – with support from the Gary Sansom Scholarship awarded by AgriFutures – investigated whether in-ovo corticosterone (steroid hormone) exposure influenced yolk steroid hormone content and early muscle development in the chickens.

Bioplatforms facilities:
Australian Wine Research Institute

Partners: University of Adelaide (AgriFutures Australia) PhD candidate Joshua Angove (University of Adelaide)

Outcome: The project found that in-ovo corticosterone did not influence steroid hormones and there were no changes in muscle characteristics. Instead, there was evidence for increased adipogenic processes (the pathway of fat formation) in the embryonic chicken.

Impact: Understanding the mechanisms that influence post-hatch phenotypes would allow the industry to target new and innovative ideas that influence the in-ovo environment, potentially improving flock uniformity and carcass quality at market weight.

Transforming CO_2 into ethanol

Adaptive laboratory evolution of *Clostridium autoethanogenum* modifies proteome while metabolites control CO_2 chemostat fermentation

Gas fermentation of CO_2 and H_2 is an attractive means to sustainably produce fuels and chemicals. *Clostridium autoethanogenum* is a model microbial organism for industrial CO-to-ethanol and presents an opportunity for progress to CO_2-to-ethanol.

The microbe was subjected to adaptive laboratory evolution (ALE) with the aim of improving growth with CO_2/H_2. Seven ALE lineages were generated with improved growth rates. Evolved D, developed with 2% CO supplementation of CO_2/H_2, produces the most ethanol of ALE lineages. Complete multi-omic analyses show that although there are widespread changes to *C. autoethanogenum*'s proteome at the same steady-state, intracellular metabolites prevent higher ethanol production.

Despite the challenges, the strain development provided numerous insights to the metabolism of CO_2/H_2, contributing to the understanding of redox homeostasis.

Bioplatforms facilities:
Queensland Metabolomics and Proteomics (Q-MAP)

Partners: LanzaTech and ARC CoE in Synthetic Biology

Outcome: Gas fermentation using acetogens is already used for CO_2-to-ethanol conversion at industrial-scale by LanzaTech and has the potential to valorise a range of C1 and waste substrates into useful products. Advances in analytical quantification and metabolic modelling have helped guide industrial gas fermentation designs.

Impact: The project provided a technological springboard towards a pathway of conversion of CO_2, the most abundant greenhouse gas, into useful products such as ethanol.

Bioinformatics

Australian BioCommons is building digital capability in Australian life sciences. BioCommons continued to support a broad range of communities through collaboration with strategic partners during 2021-22.

The launch of the Australian Apollo service for collaborative genome annotation

The production of high-quality genomes requires several steps which include: (1) assembling DNA sequences into chromosome level structures, (2) annotation (identifying genes and other elements) of those assemblies using various automated methods, and finally (3) the manual checking, curation and correction of the automated annotations.

Due to its highly manual and specialist nature when an expert eye is cast across the automated annotations looking for, and correcting errors, this last step may take years to perform by large groups of individuals. The community roadmaps developed by BioCommons together with the Genome Annotation and Genome Assembly Communities identified a critical infrastructure gap that there is currently only one tool which facilitates real-time collaborative curation and genome annotation editing – Apollo. However, setting up Apollo is far beyond the capability of most research labs due to the IT skills and computational infrastructure required to underpin it.

The team worked with researchers undertaking genome annotation research to develop the service. BioCommons launched the Australian Apollo Service to offer access to the popular tool, along with a valuable layer of IT support. The new Australian Apollo Service allows researchers to focus on the genome annotation curation itself by taking care of all the system administration and hosting customised, local instances of Apollo.

Service partners: QCIF and Pawsey Supercomputing Research Centre

Beta testers and users: CSIRO, University of Queensland Southern Cross University

Training partners: QCIF, French National Institute for Agriculture, Food, and Environment, and Erasmus Medical Center, The Netherlands

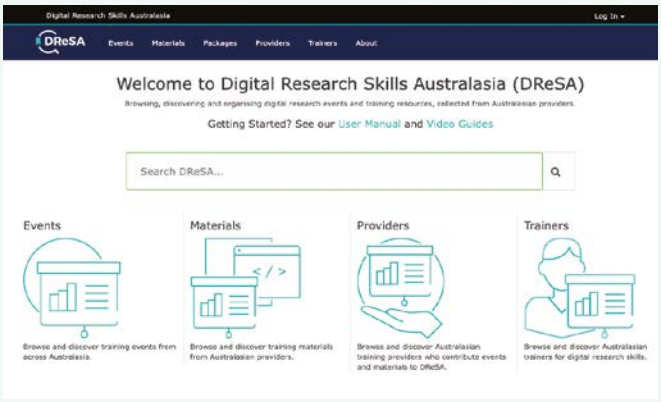
Virus research tips Galaxy Australia over 3 million jobs

Currently utilising Galaxy Australia for RNA-Seq analysis and assembly of SARS-CoV-2 genomes, power user of the analysis platform and Galaxy training resources, Dr Rhys Parry, makes his research affordable by utilising Galaxy's reproducible and modular pipelines to avoid the expense of proprietary software.

Dr Rhys Parry, a postdoctoral Research Fellow, RNA Virology Lab in the School of Chemistry and Molecular Biosciences, University of Queensland, extensively uses Galaxy Australia. He previously assembled close to 4000 RNA-Seq datasets from samples from all over the world - a task that would have been impossible for him to complete without Galaxy Australia.

In his current work, Dr Parry used Galaxy Australia to undertake de novo assembly of the transcriptomes of two medically important mosquito species, *Aedes aegypti*, the yellow fever mosquito and *Aedes albopictus*, the Asian tiger mosquito. These two mosquitoes vector significant viruses including Dengue, Zika and Yellow fever.

This has enabled worldwide diversity and evolution of the virome of these two mosquitoes to be elucidated which is now being applied to further research into Dengue, Zika and Yellow fever.



Collaboration creates a new national training registry

Australian BioCommons has long benefited from a close connection with ELIXIR Europe through its ELIXIR – Australian BioCommons Collaboration Strategy, and specifically through its Training Platform and Bioinformatics Training Advisory Group. The impact of being able to draw on the experience of international peers is demonstrated by the launch of a new training events and materials portal for Australasia based on ELIXIR's TeSS.

An active national working group (including BioCommons) convened by the ARDC was connected with the TeSS project staff to deliver the tailor-made Digital Research Skills Australasia (DReSA).

DReSA (Digital Research Skills Australasia, https://dresa.org.au/) is a new online portal for Australia that makes it easier for researchers, learners, trainers, and training providers to find digital research skills-focused educational events and resources.

The extensions and customisations developed for DReSA are also feeding back into improving the portal deployed in Europe by ELIXIR (TeSS).

Partners in the project include: Australian Research Data Commons (ARDC), Pawsey Supercomputing Research Centre, Intersect Australia, CSIRO, Deakin University, Sydney Informatics Hub - University of Sydney, National Computational Infrastructure, University of Newcastle, Federation University, Monash University, QCIF and the University of Queensland and ELIXIR-UK.

Galaxy Australia

The digital analysis service, Galaxy Australia, has grown to become a critical research infrastructure for the Australian life sciences community. Rapid development, including continual code base improvements and new hardware offer access to best practice pipelines and tools in genomics, proteomics and metabolomics.

Over the 2021–2022 period, Galaxy Australia has supported the training of 1,162 researchers including undergraduates and Masters students, as well as supported 52 publications.

Galaxy Australia annual growth at the end of 2020/2021:

Users

19,467

↑ 56%

Jobs run

4,463,009

↑ 50%

Datasets created

10,497,524

↑ 54%

BIOPLATFORMS AUSTRALIA

Bioplatforms Australia is a non-profit organisation that supports Australian Life science research by investing in state-of-the-art infrastructure and expertise in genomics, proteomics, metabolomics, bioinformatics and synthetic biology. Investment funding is provided by the Commonwealth Government National Collaborative Research Infrastructure Strategy.

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

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