



marine
bioproducts
cooperative research centre

Annual Report 2022/2023



AusIndustry
Cooperative Research
Centres Program



Our vision

*is for Australia to
be recognised as
a major supplier
of premier and
innovative marine
bioproducts
globally.*

Our mission

*is to transform
Australia's
emerging marine
bioproducts sector
into a globally
competitive
industry.*

Jeremy Bishop / Unsplash

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From the Chair



I am delighted to present the second Annual Report of Marine Bioproducts CRC (MBCRC), which again highlights the tremendous achievements of the past year.

This year we welcomed four new directors to MBCRC's independent Board – Heather Kent, Hon Niall Blair, Dr Kathy Ophel Keller and Dr Leah Talbot, bringing us to the full complement of seven

highly experienced directors who provide strong governance for the CRC.

The first full Board meeting (minus Dr Leah Talbot who was appointed in 2023) was held in-person in Adelaide in November 2022 at MBCRC Headquarters, and our first Annual General Meeting was held on the same day via a hybrid in-person and virtual meeting.

MBCRC's Board directors also participate in our Board Committees which were formed this year. The Research Committee oversees the implementation of our first 5-year Strategic Research Plan; the Education and Training Committee oversees our Connect Educate Train (CET) program and the Audit and Risk Committee monitors financial reporting processes, compliance processes, the performance of auditors and the audit program.

I was delighted to open the second annual conference of MBCRC – 'Marine BioConnect 23' in late August. The conference provided the opportunity for a broad cross section of the CRC community to hear about the progress made to date, and discuss our plans for the new few years. The energy, ambition and willingness of all

present to engage in open discussion was compelling, as were the sense that we can (and must be) a collective interested in being more than the sum of our parts.

Marine BioConnect 23 highlighted the need for the MBCRC to have a clear strategy for how we ensure that industry, university and government investment (in \$ and time) is harnessed to provide optimal benefit to individual companies, and to the sector more broadly.

The Board has asked Justin Coombs and his team to begin consultations to inform a strategy that will include research and development pathways, enhanced national and international partnerships, and exploring opportunities for leveraging our CRC funding to attract further investment.

I look forward to discussing this as BioConnect 24!

I would like to sincerely thank all Board directors, our management and research teams for their excellent work this year.

John Gunn
Chair

From the CEO



Building on our work last year of establishing the infrastructure, systems, policies and processes to create a solid foundation for the CRC, this year has focused on business development and expanding our partnerships and projects with industry.

As at the end of the financial year, 33 projects had been approved with a total project value of >\$19m (cash and in-kind). Twenty-eight of these projects were active or complete projects, with ~\$16m

total value. MBCRC is currently targeting another 15 projects to be approved over the next financial year.

Three new Core Partners joined MBCRC this year – Australian Algae Services, Yumbah Aquaculture and Venus Shell Systems. AgriFutures Australia has joined as a third party, focussing on projects with broad scope and application across the MBCRC. We also welcomed Seasol, a division of the Dulux Group, ABSciex Pty Ltd and SeaMarc Pty Ltd as supporting partners.

MBCRC's official launch event was held in November 2022 at the Tonsley Innovation Precinct following the Board meeting and AGM. Ninety-two people attended including a number of representatives from MBCRC Partners and government VIPs.

During the financial year planning was also undertaken for MBCRC's second annual conference 'Marine BioConnect 23', held in late August 2023, which brought together industry, research, students and ECRs to explore the challenges and opportunities in creating the new marine bioproducts industry, and what is needed to achieve it. The event was a great success with close to 130 registrants and very positive feedback on both the program and social networking events. Planning is already underway for next year's conference.

The MBCRC team also participated in numerous local, interstate and international industry meetings, forums and conferences.

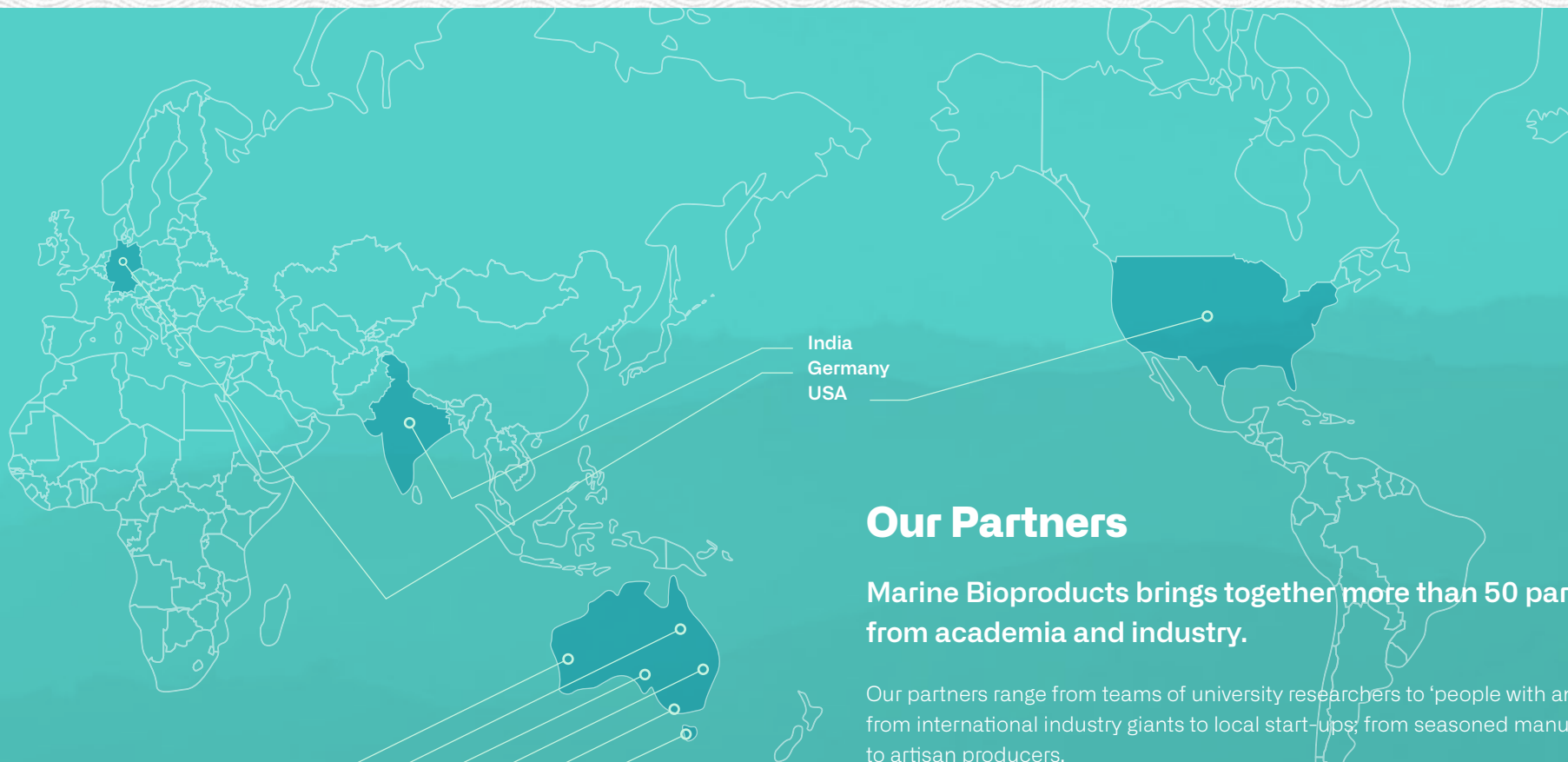
We were delighted to be a Gold Partner for the 2023 International Seaweed Symposium held in Hobart, Tasmania 19-24 February, with five MBCRC staff attending in person. A number of MBCRC's partners, both industry and research, were also present. The CEO and Research Director presented and facilitated sessions, and a site visit to Core Partner Sea Forest Ltd's seaweed production/processing facilities was attended by MBCRC staff.

Also in February our headquarters moved from Flinders University to commercial premises located in the Kent Town business district on the fringe of the Adelaide CBD. This has allowed the CRC to establish its own identity and presence and co-locate all head office employees together as a team.

Several MBCRC hard copy and digital publications were produced this year including the Annual Report, a 'who we are' brochure for introducing the CRC to potential partners, numerous articles for the website and social media channels, and our *Just One Drop* magazine featuring MBCRC's Industry Partners. Our website continues to develop in response to the needs of industry, research and students. To this end we have also created a new grant report to let industry partners know of upcoming funding opportunities.

I am very pleased with the CRC's progress this year and extend my thanks to the Board, management and research teams for all of their hard work in realising the next stage of MBCRC's development.

Dr Justin Coombs
Chief Executive Officer



India
Germany
USA

Australia

- Western Australia
- Queensland
- South Australia
- New South Wales
- Victoria
- Tasmania

Our Partners

Marine Bioproducts brings together more than 50 partners from academia and industry.

Our partners range from teams of university researchers to ‘people with an idea’; from international industry giants to local start-ups; from seasoned manufacturers to artisan producers.

Three new Core Partners joined the CRC this financial year via a Deed of Accession to the Core Partner Agreement – **Australian Algae Services**, **Yumbah Aquaculture** and **Venus Shell Systems**. **AgriFutures Australia** has joined as a third party, focussing on projects with broad scope and application across the MBCRC. We also welcomed new Supporting Partners: **Seasol**, a division of the Dulux Group, **ABSciex Pty Ltd** and **SeaMarc Pty Ltd**.

Core Industry Partners



Core Research Partners



Industry Alliance



Supporting Partners



Governance

The Marine Bioproducts CRC Board is fully independent of all Partners to ensure impartiality in funding approvals and IP utilisation plans, and is chaired by John Gunn.

Three new Board Directors were appointed in November 2022 via Circulating Resolution of the Members (14 Core Partners are Members of MBCRC Ltd.), and one Board Director was welcomed in 2023, bringing an additional four to reach the full Board complement of seven.

- John Gunn (Chair) ongoing
- Prof Tony Peacock (NED) ongoing, reappointed for 3 years
- Dr Meera Verma (NED) ongoing, reappointed for 3 years
- Heather Kent (NED) new member, appointed for 3 years
- Hon Niall Blair (NED) new member, appointed for 2 years
- Dr Kathy Ophel Keller new member, appointed for 2 years
- Dr Leah Talbot, new member, appointed for 2 years

The first full Board meeting (minus Dr Leah Talbot who was appointed in 2023) was held in-person in Adelaide in November 2022 at the MBCRC Headquarters with all Directors present.

The first Annual General Meeting was also held in November at the MBCRC Headquarters via a hybrid in-person and virtual meeting. MBCRC Board Members, CEO, Operations Manager, Auditors and three Members were present in-person. The remaining members joined virtually.

Board of Directors



John Gunn, Chair

John has conducted, led, translated; and communicated science that is focused on the sustainable use of marine ecosystems and resources for over 35 years. Senior positions have included Chief Executive of the Australian Institute of Marine Science (AIMS), Chief Scientist of the Australian Antarctic Program, and Deputy Chief of CSIRO's Marine and Atmospheric Research Division.



Dr Tony Peacock, Director

Tony is one of Australia's most experienced innovation managers. He has managed the Pig Research and Development Corporation, the Pest Animal Control Cooperative Research Centre, the Invasive Animals CRC and most recently the Cooperative Research Centres Association (2010–2020).



Professor Meera Verma, Director

Meera is a professional executive with expertise spanning the global healthcare, product development and biotechnology delivery industries. She is Director of Headland Vision, a strategic product development advisory and consultancy company, and previously served as Site Director for the Adelaide-based R&D and manufacturing facility of Hospira, a global specialty pharmaceutical and medication company.



Heather Kent, Director

With extensive experience in the not for profit sector, Heather has held executive level roles for almost three decades and is currently CEO of the St Vincent de Paul Society of Tasmania. For the past five years, she has also been a member of

the Legal Profession Board of Tasmania as a lay representative.

Heather's numerous professional awards include: Telstra Business woman of the Year Awards Tasmania Winner/National Finalist – Community and Government, and Tasmanian Chamber of Commerce and Industry Awarded Business Leader of the Year – SME Sector.



Dr Kathy Ophel Keller, Director

Kathy has led and undertaken research in primary industries for over 30 years. She has led national programs in plant biosecurity and molecular detection of soil microbes, including commercialisation of technologies.

She has held senior management positions in SARDI, the research division of PIRSA, with a focus on applied research in partnership with industry.

Kathy's research background is in plant biosecurity and molecular detection of plant pathogens, with a strong track record in developing and leading national research programs, with industry co-investment.



Hon Niall Blair, Director

The Hon. Niall Blair is a highly skilled professional with more than twenty years' experience in Government and key private sectors, including risk management and agribusiness.

A strategic, innovative thinker and adopter of new technology and production systems, the Hon. Niall Blair is an accomplished Chairperson and negotiator, public spokesperson and diplomat with strong domestic and international trade connections.

He also has financial accountability and corporate governance experience with a strong background in risk management and safety, quality and environmental management system development and auditing.



Dr Leah Talbot, Director

Dr Leah Talbot is an Eastern Kuku Yalanji woman from far north Queensland and an Indigenous researcher with the Northern Australian Indigenous Land and Sea Management Alliance LTD (NAILSMA). Previously she worked as an Indigenous Social Ecological Researcher with CSIRO.

Leah's PhD research explored how Indigenous governance systems recognise and support the application of Indigenous knowledge in protected areas. She has a deep understanding of the role of Aboriginal people in contemporary environmental management.

Meet the Management Team



Dr Justin Coombs
Chief Executive Officer

Justin is a biotech industry leader. By background, he is a PhD-trained scientist and a biotech specialist patent attorney. His areas of expertise are in biotech enterprise development, R&D program development, intellectual property, technology transfer and commercial strategy across a broad range of technology-focused organisations including biotech companies, Government industry-development organisations, not-for-profits, and in managing or advising a number of CRCs. Justin is also a non-executive Director on the board of Cooperative Research Australia.



Ms Belinda Wade
Operations Manager

Belinda is a business development specialist with an honours degree in biotechnology. As Business Development Coordinator (Strategic Partnerships) for Flinders University, she was instrumental in bringing together the key elements that saw Marine Bioproducts progress from a working concept through to a fully-fledged (and fully funded) Cooperative Research Centre.



Dr Simon Odell
Research Program Manager

Simon has an Honours Degree in Biotechnology, a PhD in Soil Science, and a Graduate Diploma in Oenology.

Having worked for over 20 years across the Environmental, Wine, and Brewing industries in a mixture of technical, management and consulting roles, Simon brings to the team a wide, commercially-focused skill set.



Ms Jane Keane
Executive Assistant

Jane has been with Marine Bioproducts CRC since January 2022, overseeing office administration and providing support to the MBCRC management team.

Before her appointment, she served as Executive Assistant to the Director, Centre for Marine Bioproducts Development at Flinders University for 10 years.



Dr Gretta Koch
Communications Consultant

With over 25 years of experience in writing, editing, teaching and research, Gretta has worked on a wide variety of marketing and communications materials and activities across different sectors.

Gretta has an Honours degree in Professional Writing & Communication and a PhD in Cultural Studies.

Research Programs



Professor Wei Zhang

Research Director

Wei has worked as a bioprocess engineer and marine biotechnologist since 1989. He is recognised internationally as an exceptional engineer and a visionary thought-leader in translational research and technology commercialisation in marine bioproducts engineering, industrial and pharmaceutical biotechnology.

He has driven national and international partnerships across governments, universities, industries, professional societies and communities in driving the growth of Australia's rapidly emerging Marine Bioproducts industry.



Professor Wei Zhang, Professor Rob Capon and student Zafar Abu MD.

2022-2023 Research program highlights

The MBCRC Research Strategic Plan 2021-26 was finalised this year and outlines:

- how MBCRC will deliver high-quality, collaborative and industry-focused research outputs;
- our strategic research objectives;
- how research success will be measured; and
- seven key impacts on industry.

An infographic synopsis of this strategy was posted to our website at mbcrc.com.

The MBCRC Board Research Committee has now been established and meets approximately once a quarter and ad hoc/out-of-session where necessary. The committee consists of three directors: Kathy Ophel Keller (Chair), John Gunn, Tony Peacock, and MBCRC CEO Justin Coombs.

The Research Committee oversees the development and implementation of MBCRC's 5-year Strategic Research Plan, including the approval/recommendation process linked to the awarding of MBCRC Research Projects. The agreed framework currently has delegated authority for project approvals at all levels, from CEO to Research Committee to full Board.

Program 1: Sustainable Marine Resources Growing marine bioproducts



Professor Catriona Macleod

Catriona has a PhD in Aquaculture from the University of Tasmania. Her research focus is on sustainable development in marine and coastal systems, and science-

based management and decision-making, with specific expertise in environmental, economic, and social sustainability.

Program 1 aims to increase the range and biomass of Australian marine products available for processing and bioproduct development. It is also essential to ensure that production strategies are sustainable, and key to this is making sure that governance and management mechanisms are appropriate and that any risks are addressed. As such the program deals not only with the practical aspects of growing macro/micro algae (site selection, species selection, biofouling/contamination management, environment conservation) but also best practice governance (social license and regulatory frameworks – transparency, accountability, certification, biosecurity issues, risk assessment and carbon trading).

Partners/Stakeholders

Program 1 includes a number of primary production partners with a focus on macro- and microalgae, some with well-established production capacity and others with production aspirations. We also have a number of partners with an interest in value-adding to other species production models. Our research partners have skills and capabilities in primary production, sustainable management and in governance.

We currently have three completed projects in Program 1: two were novated as part of our collaboration with FRDC and have provided valuable information on seaweed production issues. The other was a very short targeted project which supported Indigenous engagement at the international seaweed conference in Hobart, but which has also provided a report with extremely useful insights into Indigenous engagement strategies more broadly.

We have five projects underway with three looking at options to add value to existing marine bioproduction and two examining broader management issues including market access and biosecurity and risk management. There are six new projects currently being developed; three are focused on further improving and streamlining governance structures, one is seeking to improve existing species cultivation, and one is focused on new species development and improving Indigenous opportunities in aquaculture.

In addition to producing projects within the MBCRC directly we also continue to have a focus on developing links between other funding initiatives such as the Blue Economy CRC, Northern Australia CRC and RDC partners more broadly, with the explicit aim of optimising funding benefits for the marine bioproducts sector.

“ **Risk appropriate governance is key to the development of the Marine Bioproducts industry. The MBCRC is working with all our partners to better understand what is needed for this sector to be truly sustainable. The opportunities in this sector are significant and embracing the circular economy is key to that.** ”

Professor Catriona Macleod

Program 2: Innovative Bioprocessing Technologies Making marine bioproducts



Professor Colin Barrow

Colin is an Alfred Deakin Professor in Biotechnology, Deputy Director of the ARC funded ITTC for Green Chemistry in Manufacturing and Director of the Centre for Sustainable

Bioproducts. He is also the lead of the Deakin BioFactory, a purpose-built modular bioprocessing facility.

The aim of this program is to convert marine biomass into marine bioproducts using advanced biomanufacturing, with the goal being complete biomass utilisation using a biorefinery approach. Key program goals are to develop first, second and third generation techno-economic modelling, bioprocessing and automation, toward de-risking investment in advanced manufacturing of bioproducts.

Partners/Stakeholders

Partners in Program 2 include research partners with bioprocessing capability and industry partners that aim to develop biomanufacturing capability or have equipment or other technology that can assist in the development of innovative bioprocessing technologies. Ten research projects jointly led by Industry Partners and Core Research Partners have been approved, of which six are currently in the active research phase while two have been completed. Additional projects are at various stages of development.

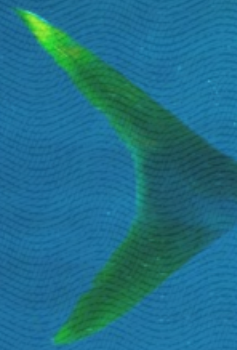
In addition to industry-led projects we are also working to network bioprocessing capability together across Australia, including building new bioprocessing capability, in conjunction with both research and industry partners. We are planning to formalise this through a searchable database of capability.

“ **With ten projects approved in the last year and linked bioprocessing capability established across both industry and research partners, we are positioned well to continue to develop the innovative bioprocessing capability to grow the marine bioproducts industry.** ”

Professor Colin Barrow

**COMING
TOGETHER IS
A BEGINNING,
STAYING
TOGETHER IS
PROGRESS,
AND WORKING
TOGETHER IS
SUCCESS.**

Henry Ford





Program 3: Australian Marine Bioproducts Delivering marine bioproducts



Professor Rob Capon

Rob leads an internationally renowned lab specialising in the discovery of biologically active molecules from Australian marine invertebrates, algae and microbes.

Rob and his team have leveraged the chemical and biological properties of marine chemistry to inspire innovative solutions for scientific, commercial, and societal challenges – including new human and animal health products, and new crop and environmental protection agents.

The aim of MBCRC Program 3 is to improve existing and develop new environmentally sustainably marine bioproducts from Australian macroalgae, microalgae and microbes, as well as bycatch, biofouling and other marine biowaste streams, along with development of specialist biobusiness tools to fast-track commercial success across the Australian (and global) marine bioproducts sector.

Partners/Stakeholders

Over the last years the MBCRC has continued to attract new research partners with an interest in new and improved marine bioproducts. Significantly, our streamlined application and approval process has enabled numerous projects and collaborations across the MBCRC – linking specialist researchers at many of Australia’s leading research institutions with over a dozen industry partners.

“ *With so many “shovel ready” projects launched the MBCRC is off to an excellent start. I’m excited at the prospect of the next phase of MBCRC projects, that I predict will be dominated by new challenges, necessitating new approaches and collaborations, underpinned by excellent science.* ”

Professor Rob Capon

Program 4: Connect Educate Train Growing the marine bioproducts sector



Associate Professor Kirsten Heimann

Kirsten was Principal Research Scientist at the Centre for Marine Bioproducts Development, Flinders University and she was also the

Research Director of the China-Australia joint laboratory for Native Bioresource Industry Innovation (CANBI2). She was the Course Coordinator of the Master of Biotechnology at Flinders University.

The aim of the Connect Education and Train (CET) program is to train the required workforce and develop the industry leaders for the Australian Marine Bioproducts Industry. This, together with building necessary national and international networks is fundamental to ensuring that Australia plays a leading and internationally recognised role in this industry sector.

Partners and stakeholders in the CET program include research providers, where students conduct research directly with industry partners to solve challenges by providing answers and innovation. Vocational education and training (VET), utilising and shaping government training portfolios for the industry, is the second vehicle used to build the future workforce and a specific Indigenous VET program has been drafted to create opportunity for Indigenous school leavers to join the workforce and realise business opportunity. Industry upskilling itself will be pursued to strengthen business performances of the Australian Marine Bioproducts Industry.

2022-2023 highlights of the Connect Educate Train (CET) program

MBCRC's CET Five Year Strategic Plan was finalised. The CET plan includes strategies for broadening the scholarship range to include a focus on technical skills development, as well as an industry-led approach for Higher Degree Research project development.

Eleven projects involving students are registered. To date there are 11 project students with five enrolled in a PhD, four undertaking Honours, one a Master of Biotechnology and one a Master of Science.

The CET Advisory Panel was replaced by the MBCRC Board Education and Training Committee.

MBCRC's Indigenous VET program was circulated for feedback:

- Following feedback by SARDI, the MBCRC Indigenous VET program syllabus was revised to include two additional modules relating to fisheries specifically.
- Once finalised the document will be distributed to stakeholders, Indigenous groups such as Narrunga Nation who were involved in meetings prioritising their training needs, relevant industries, TAFE and other providers.

Multiple workshops were held throughout the year as outlined on the next page. A two-day face-to-face student induction workshop on good scientific practice was also held.

Training workshops provided

- Project leader and industry co-lead induction
- MBCRC-CIS Investment bootcamp for SMEs
- Business case development training for SMEs
- MBCRC Good Laboratory Practice workshop
- MBCRC IP workshop
- MBCRC IP workshop – drafting claims
- MBCRC Team development workshop
- MBCRC Business models + impact workshop
- MBCRC Student, ECR, Project Leader induction
- MBCRC Student, ECR Good laboratory practice workshop
- MBCRC ECR Experimental design training



Front L to R: Jessica Gibbs, Valeria Sanders, Bonnie Homer, Imogen Morison, Adele Mastroiannis

Back L to R: Cheng Yang, Manav Subbanna, Zafar Abu MD, Dylan Ebner

Other workshop engagement activities

- Understanding production systems/technologies for growing bioproducts
- Macroalgae-derived cosmetic ingredients
- Industry-engagement panel discussion with SA Chief Scientist
- Engaging with industry
- KPMG-Austrade workshop on medicinal microalgae opportunities and wider applications
- Future Energy Week – Circular Economy Panel
- Indigenous business showcase.

MBCRC was proud to sponsor an AgriFutures Horizon Scholarship for Imogen Morison from The University of Queensland. MBCRC also hosted its first industry internship for PhD student Adele Mastroiannis from Flinders University.

The MBCRC Good Research/Laboratory Practice Lab Book has been designed and printed.

Research Quality, Lab Book, and Intellectual Property and Conference policies have also been developed.

The MBCRC website was updated to provide an opportunity to advertise research and other industry opportunities for students and Early Career Researchers. Planning is also underway to develop a student portal on the website to make it easier to access relevant information.



Stories from Marine Bioproducts CRC partners, changing our planet one drop at a time...

Marine Bioproducts CRC's online 'magazine' entitled *Just One Drop* highlights and promotes the great work of our Partners in the marine bioproducts sector via feature magazine-style articles.



Kelp: a golden dawn?
Sea Health Products, NSW

In 2015, Jo Lane bought a seaweed 'cottage industry' on a whim. Now she's charting a course to establish Australia's first commercial kelp farm – but it's not all plain sailing...

Read the full article at mbcrc.com



An Australian first – biodynamic liquid fertiliser produced from seaweeds and fish processing wastes

Industry Partners

The South Australian Research and Development Institute (SARDI) and Dinko Tuna Farmers (Dinko).

In an Australian first, native seaweed is being farmed for liquid fertiliser under a joint SA government and industry research program at Dinko finfish aquaculture site in Spencer Gulf. SARDI and Dinko harvested their first licensed crop of native seaweed in the waters off Port Lincoln in December 2022. Dinko is working with SARDI to develop biodynamic liquid fertiliser from seaweeds and fish processing wastes.

Industry challenge

This project is driven by significant market interest in developing an Australian liquid seaweed and seafood processing wastes-derived fertiliser product. It also enables Dinko to utilise the tuna aquaculture site year-round, filling the void after the fish are harvested each winter.

While the fertiliser processing and product development from these marine biomasses are well documented, the key challenge for this project is the development of processing technologies that are unique to the heterogeneous marine biomass available at Dinko.

Seaweed biomass harvested from the settlement ropes vary in species composition seasonally and possibly spatially depending on the prevailing physico-chemical conditions of the marine environment. This variability could also be expected from fish processing wastes that will comprise waste streams originating from multiple species. The project aims to develop manufacturing processes to address the challenges associated with this heterogeneous feed stock.

The outcome

There has been good progress in moving towards an efficient pilot scale process, which our partners anticipate will be quite successful in the next six months.

- Aggregation of fish processing waste and cultivated native seaweed biomass for laboratory-scale and pilot scale trials completed.
- Survey of seaweed production lines complete and preparations are underway for harvest in November.
- Design of the pilot bioreactor is now complete and preparations are underway to go to select tender for fabrication of the units.

The impact

SARDI and Dinko have already developed a seaweed cultivation system, and for this project they developed an optimised modular seaweed production system with a good understanding of the settlement rates, community composition, seasonal variabilities, optimal depth and orientation for settlement and the assimilation rates of nitrogen, phosphorus and carbon.

The demand for seaweed and fish-based fertiliser globally is expected to double by 2031, so this is a significant economic opportunity. The project is also helping to reduce the local aquaculture industry's environmental footprint.

What's next?

South Australia's seaweed industry is projected to be worth over \$100 million, with the capacity to create hundreds of jobs in regional areas.

The success of this project has very positive implications for the continued growth of sustainable, marine-derived agricultural products from South Australian seaweed.

Processing and extraction of carotenoids from cyanobacteria

Industry Partners

Bondi Bio Pty Ltd and University of Technology Sydney (UTS).

Industry challenge

Processing to extract carotenoids (pigments) is very energy intensive. In addition, natural solutions to petrochemicals are unsustainable and associated with lower quality and less nutritional value.

Driven by the fast-growing, over US \$1bn carotenoid market, this project aims to assess, develop and optimise efficient downstream processes for extracting carotenoids from Bondi Bio's engineered cyanobacteria.

The project leverages the specific expertise of UTS in algal biomass processing and employs specialised infrastructure including spray drying, freeze drying and supercritical CO₂ fluid extraction (SFE) equipment.

The outcome

The primary outcome of this project was to establish a proof-of-concept extraction process for the carotenoid astaxanthin from Bondi's cyanobacteria strains. This facilitates the use of Bondi's fast-growing, engineered cyanobacteria to cultivate high yields of carotenoids, converting carbon dioxide into highly sought after ingredients.

This will support the development of bioprocessing expertise of marine biomass within Australia, which will be relevant to other marine microorganisms and products.

The impact

- Improve domestic supply chains for the nutraceuticals, aquaculture and agriculture industry including carotenoids as both a nutritional supplement for humans and a feed supplement for salmonid fish farms.
- Rapid innovation of photosynthetic engineered bacteria not achieved anywhere else in the world.


What's next?

The solar bioengineered platform has huge potential to cultivate key bioactives for a range of commercial enterprises that have not yet been considered.

Our Impact

In addition to the clear industry and economic benefits that Marine Bioproducts CRC is seeking to realise for Australia, there is a much broader legacy we are hoping to realise over our ten year CRC, including:

- **First Nations** – economic development of First Nations businesses, and First Nations specific education and training programs to upskill young people to work in the emerging marine bioproducts industry
- **Green solutions for agriculture** – technologies for greenhouse gas abatement, development of new agrochemicals derived from marine natural products
- **Environmental sustainability** – development of new biomaterials including novel bioplastics and textiles
- **Health and Food Security** – development of new pharmaceutical and complementary health products
- **Regional jobs and development** – the bulk of the industry development around marine bioproducts is projected to occur in regional Australia, thus MBCRC has a strong regional development focus.



**THE SEA, ONCE IT
CASTS ITS SPELL,
HOLDS YOU IN ITS
NET OF WONDER
FOREVER...**

Jacques Cousteau



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