

2022 Annual Report



Climate
Change
Cluster (C3)

Acknowledgement of Country

C3 acknowledges the Gadigal People of the Eora Nation, the Boorooberongal people of the Dharug Nation, the Bidiagal people and the Gamaygal people upon whose ancestral lands our university stands.

We would also like to pay respect to the Elders both past and present, acknowledging them as the traditional custodians of knowledge for these lands.

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Director's Report

Australia's climate is changing; so is our media, government policy, and stewardship for business to consider and reduce their impact on the environment. C3 is a pioneer in supporting Australia's shift towards addressing climate change, contributing to C3 being "thought leaders" in this space.

Throughout 2022, C3 has had the privilege to partner with organisations and companies who share strategic vision surrounding the ocean and its capabilities to support our planet. Working collaboratively has allowed us to test the frontiers of possibilities and ensure our partners can be impactful in their industry. Change comes with innovation and research, and we want to keep pushing these boundaries to ask what is possible and delve deeper into the unknown. Our partners want to be part of this journey and see the benefits of collaborative research as a tool for driving change.

Oscillating between practical and theoretical applications of science has been a benchmark of C3's aims and now we are pivoting towards a shift in alignment with the UN's Sustainable Development Goals (SDG's). We are working to understand our impact, how we may influence government policy, industry direction and stewardship, help drive philanthropic agendas, and support green startups who can deliver innovative solutions with the right support and investment.

Driving impact is a key focus of many C3 employees who want to support saving the planet. Four or five years ago, I was not comfortable saying that I was contributing to this goal. However, these days I'm not shy about spotlighting the impact C3 is having and am proud of our contributions. Our reputation has grown over the past 14 years as national leaders in protecting marine ecosystems and driving an economy fueled by biological resources that support, not take from our planet. We are attracting interviewees to our new positions who believe C3 provides an avenue through research and innovation to target micro-level goals that support this overarching goal. This is why partners are coming to us to look for research-driven impact.

Australia is listening and we are actively contributing to delivering theoretical and practical research that will allow Australia and its businesses to address the climate disaster.



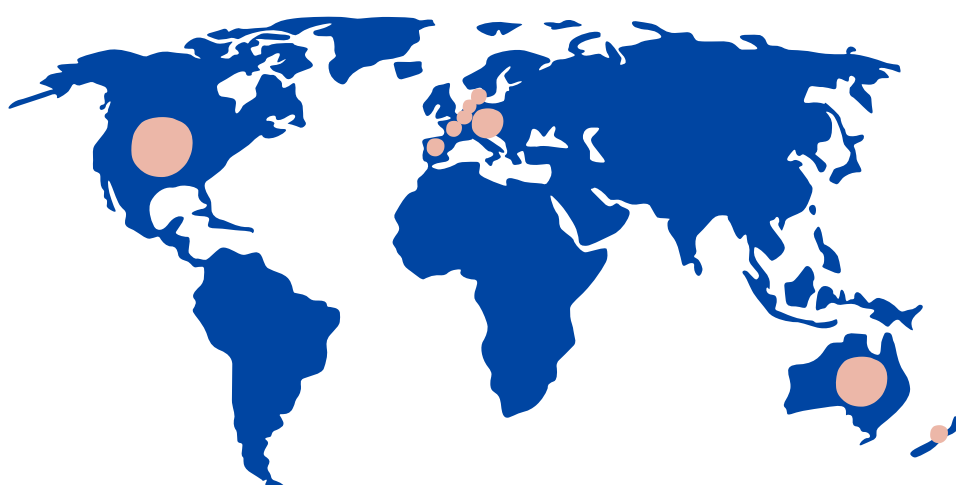
Professor Peter Ralph
Executive Director



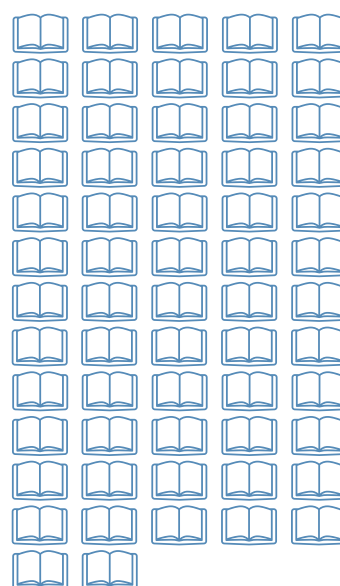
Year in Review

2022

Visitors from 9 countries



62 articles
published



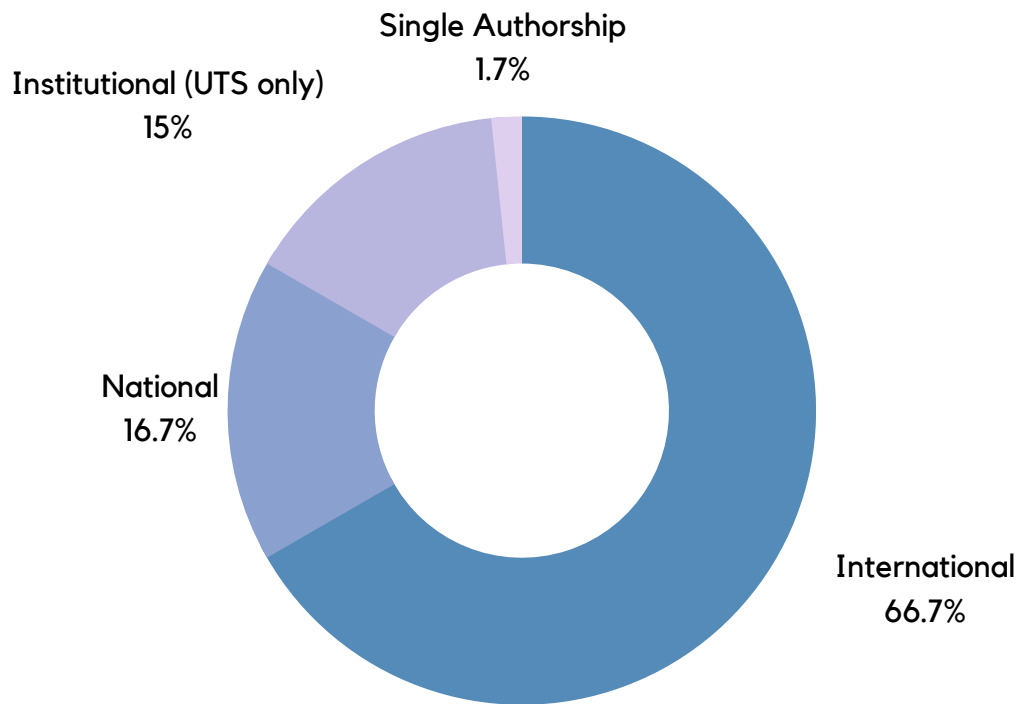
An average Field-Weighted
Citation Impact of

3.24

1,161 article
views



Our People (Dec. 2022)



Collaborating with academics from **135** institutions across **28** countries has ensured C3 can consider a diverse range of perspectives and codesign outcomes for impactful climate research.

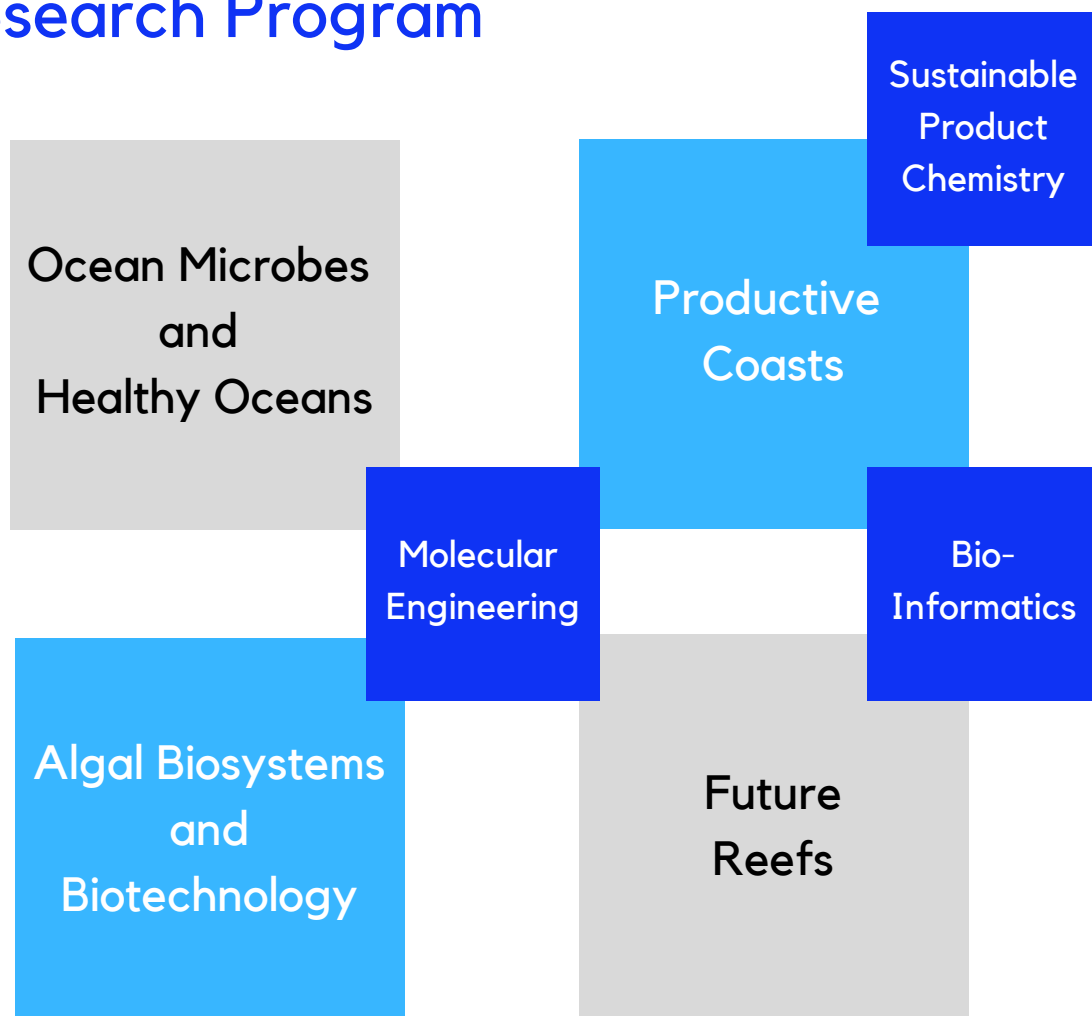
Singapore		Denmark	
	Hong Kong		New Zealand
Bangladesh		Japan	
	Ireland		Germany
Hungary		Italy	
	Switzerland		Netherlands
Chile		Spain	
	UK		Canada
China		Finland	
	Bulgaria		Czech Republic
Austria		Sweden	
	Australia		South Africa
Belgium		France	
	USA		Saudi Arabia

Our vision

To be globally recognised for transforming society through scientific discovery, we are providing meaningful strategies for climate adaptation by deepening our understanding of the impacts of climate change on ecosystems, and mitigation via innovations to Australia's bioeconomy.



Research Program



Our People (Dec. 2022)

Executive Director & Team Leader (Algal Biosystems & Biotechnology)

Peter Ralph

Team Leader (Future Reefs)

David Suggett

Team Leader (Ocean Microbes)

Justin Seymour

Team Leader (Productive Coasts)

Martina Doblin

Deputy Director & Associate Professor

Mathieu Pernice

Chancellor's Postdoctoral Research & DECRA Fellow

Emma Camp

Chancellor's Postdoctoral Research Fellows

Elliot Scanes

Jennifer Matthews

Senior Research Fellows

Jean-Baptiste Raina

Unnikrishnan Kuzhiumparambil

Research Associates & Fellows

Andrei Herdean

Manoj Kumar

Martin Ostrowski

Nahshon Siboni

Nature Poddar

Janice McCauley

Matthew DeMaere

Amaranta Focardi

Caitlin Lawson

Charlene Trestrail

Lakshmi Krishnan

Maeva Brunet

Vishal Gupta

Institute Manager

Catriona Reid

Vanessa Nolasco

Industry Engagement Manager

Alexandra Thomson

Lucy Buxton

Institute Officer

Terence Li

Research Officer

Angel Pang

Maggie Chen

Research Project Officer

Nicole Phelan

Communications Assistant

Rachael Scott

Student Promotional Representative

Emma Fineran

Technical Coordinator (Research)

Phillip Doughty

Biologics Innovation Facility Manager

David Rickards

Biologics Innovation Facility Technical Officer

Chi Pham

Our People (Dec. 2022)

Research Assistants

Alivia Price
Andrew Luong
Bernardo Campos Diocaretz
Chloe Boote
Christine Roper
Cora Hinkley
Fateme Mirakhorli
James O'Brien
Lorenzo Paolieri
Lorna Howlett
Mariana Destila Bayu Intan
Matthais Windhagauer
Michkael Ros
Mikael Kim
Nathan Williams
Nine Le Ruen
Robert Rodger
Sean Macdonald Miller

Assistant Technical Officers

Allen Lo
Anjali Krishnankutty
Anjon Mondal
Antonio Sacco
Breanna Osborne
Eloise Carroll
Fiona Shadwick
Jessica Hughan
Justin Tierney
Laura Korn
Lilian Hoch
Lucia Bennar
Massimo Bedoya
Nandhini Ravi
Paris Hanan
Taine Leyshon
Thai Bach (Eric) Luong
Thomas Goulden

Visiting Scholars

Anna Bramucci
Audrey Commault
Cassidy Jo Hayward
Chiara Maran Duijser
David Hughes
Elena Bollati
Gabriella Caucia
Jan Cerveny
Julie Bouscaras
Leen Labeeuw
Marine Pablo
Milan Szabo
Nicholas Hill
Phoebe Annamarie Argyle
Queralt Güell Bujons
Richard Adamson
Robert Zunt
Samantha Jane Goyen
Sandra McLellan
Valentina Hurtado McCormick

Adjunct Professor

Anthony Larkum
Tim O'Meara

Honourary Adjunct Fellow

Michaela Larsson

Higher Degree Research Students

Aaron Wright
Abeeha Khalil
Amanda Grima
Amber Brierley
Amelia Pezzano
Axel Olander
Bhuwan Ghimire
Carmela Isabel Nunez Lendo
Christine Dawn Roper
Farjana Akter
Fateme Mirakhorli
Gemma Gillette
Giselle Firme
Hadley England
Laura La Motta
Lorna Howlett
Mariana Destila Bayu Intan
Matthias Windhagauer
Natasha Bartels
Nathan Williams
Nicole Dileria
Nine Le Reun
Paige Strudwick
Rachael Scott
Raissa Gill
Sage Fitzgerald
Sean Macdonald-Miller
Sidaswar Krishnan



C3 Strategic Goals

Research Excellence and Impact

- 1 We will focus on research innovation and impact to help deliver a prosperous and sustainable future. We will leverage our size, expertise, and people to contribute to a better environment and society. C3 will contribute to the UTS 2027 goal of Transforming society through connected research which creates an impact that will benefit society by recognising and fostering research excellence.

Enhanced Knowledge

- 2 We will continue to disseminate our new knowledge through publishing in high-impact journals, plenary presentations and by establishing our staff as thought-leaders.

Expand External Engagement

- 3 We will build capacity for translating our research into impact through strategic partnering, commercialisation, enterprise creation, and entrepreneurship. This aligns with the UTS 2027 goal of Delivering Positive Social Change and the Australian Federal Government's University Research Commercialisation (URC) Action Plan.

Grow the Next Generation

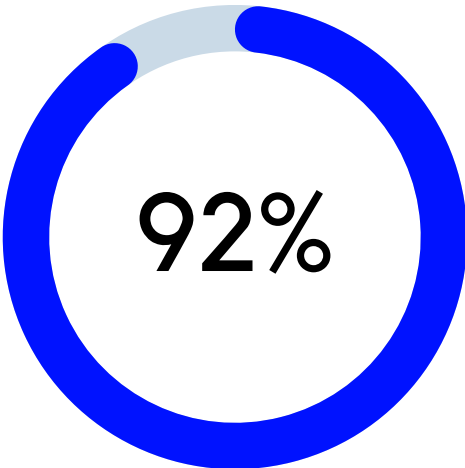
- 4 We will grow the next generation of research leaders. We will build the skills and expertise in leadership, performance management, and learning and teaching so that our community (staff and students) flourishes now and in their future.

Sustainable Growth and Operational Success

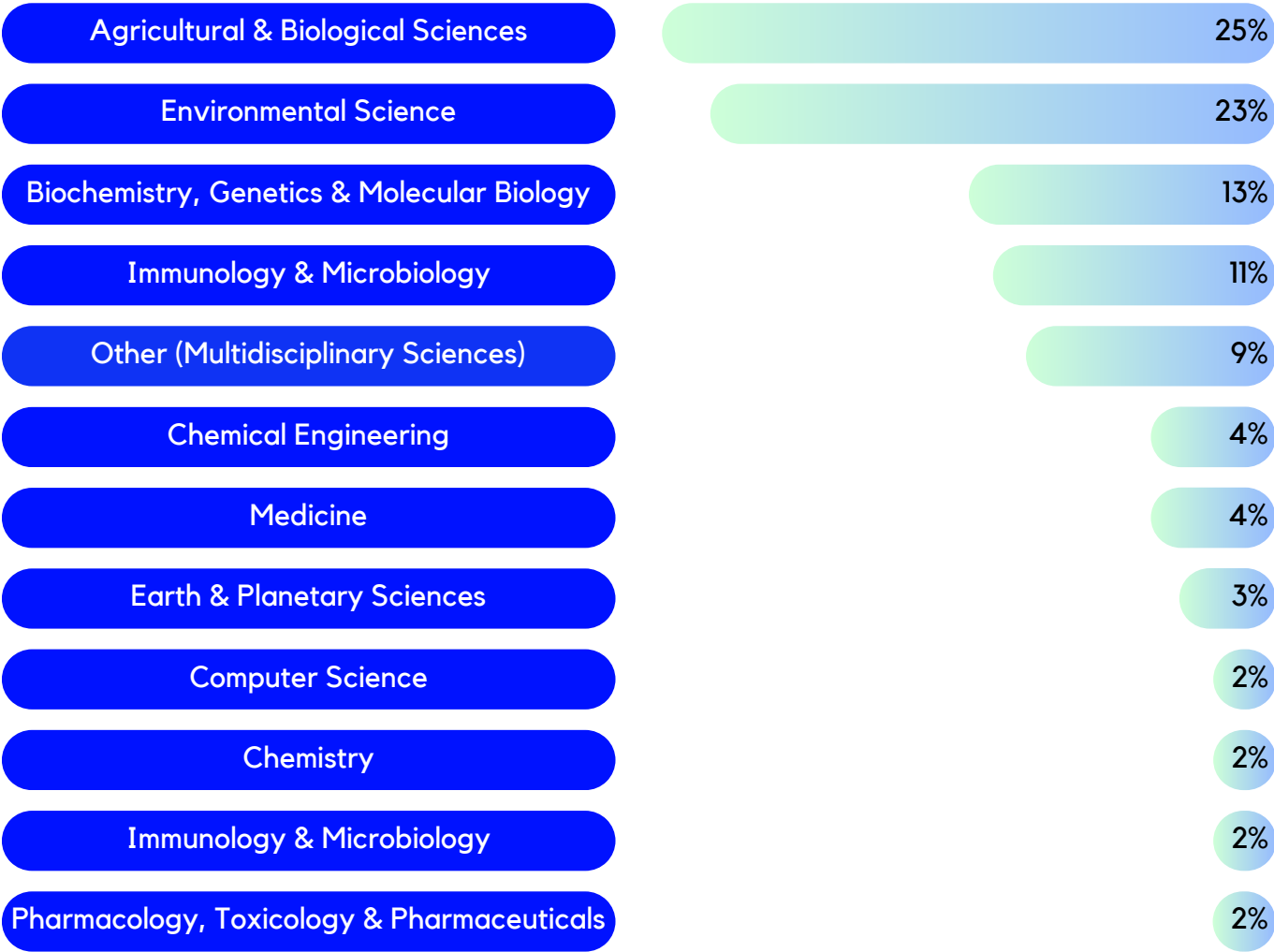
- 5 We will plan for the sustained growth of C3 through robust financial management and income diversity that will support and sustain our research and training excellence as well as our distinctive and competitive capabilities. It will be underpinned by the objective that the research institute is values-based, people-centered and supports staff throughout their career. Alignment of C3 goals with UTS 2027 through Our Precinct, Community, and Partnerships. management, and learning and teaching so that our community (staff and students) flourishes now and in their future.

Publications

Climate Change Cluster places a continuing emphasis on high impact publication.



of publications were in the top quartile (25%) of journals.



Source: Subject Area, Scival

Publications

C3 publications between Jan - Dec 2022

<p>Legacy metal contamination is reflected in the fish gut microbiome in an urbanised estuary</p> <p>Suzzi, A.L. Stat, M. MacFarlane, G.R. Seymour, J.R. Williams, N.L. Gaston, T.F. Alam, M.R. Huggett, M.J.</p> <p>Environmental Pollution</p>	<p>Phylogenomic diversity of <i>Vibrio</i> species and other Gammaproteobacteria isolated from Pacific oysters (<i>Crassostrea gigas</i>) during a summer mortality outbreak</p> <p>Worden, P.J. Bogema, D.R. Micallef, M.L. Go, J. Deutscher, A.T. Labbate, M. Green, T.J. King, W.L. Liu, M. Seymour, J.R. Jenkins, C.</p> <p>Microbial Genomics</p>	<p>Biogeography of Southern Ocean prokaryotes: a comparison of the Indian and Pacific sectors</p> <p>Sow, S.L.S. Brown, M.V. Clarke, L.J. Bissett, A. van de Kamp, J. Trull, T.W. Raes, E.J. Seymour, J.R. Bramucci, A.R. Ostrowski, M. Boyd, P.W. Deagle, B.E. Pardo, P.C. Sloyan, B.M. Bodrossy, L.</p> <p>Environmental Microbiology</p>	<p>Molecular microbiological approaches reduce ambiguity about the sources of faecal pollution and identify microbial hazards within an urbanised coastal environment</p> <p>Williams, N.L.R. Siboni, N. Potts, J. Campey, M. Johnson, C. Rao, S. Bramucci, A. Scanes, P. Seymour, J.R.</p> <p>Water Research</p>
<p>Symbiosis induces unique volatile profiles in the model cnidarian <i>Aiptasia</i></p> <p>Wuerz, M. Lawson, C.A. Ueland, M. Oakley, C.A. Grossman, A.R. Weis, V.M. Suggett, D.J. Davy, S.K.</p> <p>Journal of Experimental Biology</p>	<p>Forecasting ocean microbiome shifts</p> <p>Seymour, J.R.</p> <p>Nature Microbiology</p>	<p>Phosphate-inducible poly-hydroxy butyrate production dynamics in CO₂ supplemented upscaled cultivation of engineered <i>Phaeodactylum tricornutum</i></p> <p>Windhagauer, M. Abbriano, R.M. Pittrich, D.A. Doblin, M.A.</p> <p>Journal of Applied Phycology</p>	<p>Rainfall leads to elevated levels of antibiotic resistance genes within seawater at an Australian beach</p> <p>Williams, N.L.R. Siboni, N. McLellan, S.L. Potts, J. Scanes, P. Johnson, C. James, M. McCann, V. Seymour, J.R.</p> <p>Environmental Pollution</p>
<p>Colony self-shading facilitates Symbiodiniaceae cohabitation in a South Pacific coral community</p> <p>Lewis, R.E. Davy, S.K. Gardner, S.G. Rongo, T. Suggett, D.J. Nitschke, M.R.</p> <p>Coral Reefs</p>	<p>Physiological factors facilitating the persistence of <i>Pocillopora aliciae</i> and <i>Plesiastrea versipora</i> in temperate reefs of south-eastern Australia under ocean warming</p> <p>González-Pech, R.A. Hughes, D.J. Strudwick, P. Lewis, B.M. Booth, D.J. Figueira, W.F. Sommer, B. Suggett, D.J. Matthews, J.</p> <p>Coral Reefs</p>	<p>Temperature variability interacts with mean temperature to influence the predictability of microbial phenotypes</p> <p>Fu, F.-X. Tschitschko, B. Hutchins, D.A. Larsson, M.E. Baker, K.G. McInnes, A. Kahlke, T. Verma, A. Murray, S.A. Doblin, M.A.</p> <p>Global Change Biology</p>	<p>Spatial compositional turnover varies with trophic level and body size in marine assemblages of micro- and macroorganisms</p> <p>Pettersen, A.K. Coleman, M.A. Latombe, G. Gonzalez, S. Williams, N.L.R. Seymour, J.R. Campbell, A.H. Thomas, T. Ferrari, R. Stuart-Smith, R.D. Edgar, G.J. Steinberg, P.D. Marzinelli, E.</p> <p>Global Ecology and Biogeography</p>
	<p>Generation of <i>Synechocystis</i> sp. PCC 6803 mutant with enhanced laccase-like activity</p> <p>Hurtado-McCormick, V. Commault, A. Herdean, A. Price, S. Pernice, M. Ralph, P.</p> <p>Bioresource Technology Reports</p>	<p>Microbiomes of the Sydney Rock Oyster are acquired through both vertical and horizontal transmission</p> <p>Unzueta-Martinez, A. Scanes, E. Parker, L.M. Ross, P.M. O'Connor, W. Bowen, J.L.</p> <p>Animal Microbiome</p>	

Revival of Philozoon Geddes for host-specialized dinoflagellates, 'zooxanthellae', in animals from coastal temperate zones of northern and southern hemispheres
LaJeunesse, T.C.| Wiedenmann, J.| Casado-Amezúa, P.| D'Ambra, I.| Turnham, K.E.| Nitschke, M.R.| Oakley, C.A.| Goffredo, S.| Spano, C.A.| Cubillos, V.M.| Davy, S.K.| Suggett, D.J. European Journal of Phycology

Chemotaxis shapes the microscale organization of the ocean's microbiome
Raina, J.-B.| Lambert, B.S.| Parks, D.H.| Rinke, C.| Siboni, N.| Bramucci, A.| Ostrowski, M.| Signal, B.| Lutz, A.| Mendis, H.| Rubino, F.| Fernandez, V.I.| Stocker, R.| Hugenholtz, P.| Tyson, G.W.| Seymour, J.R. Nature

Synthesis and evaluation of cationic polyacrylamide and polyacrylate flocculants for harvesting freshwater and marine microalgae
Nguyen, L.N.| Vu, H.P.| Fu, Q.| Abu Hasan Johir, M.| Ibrahim, I.| Mofijur, M.| Labeeuw, L.| Pernice, M.| Ralph, P.J.| Nghiem, L.D. Chemical Engineering Journal

Projecting coral responses to intensifying marine heatwaves under ocean acidification
Klein, S.G.| Geraldi, N.R.| Anton, A.| Schmidt-Roach, S.| Ziegler, M.| Cziesielski, M.J.| Martin, C.| Rädcker, N.| Frölicher, T.L.| Mumby, P.J.| Pandolfi, J.M.| Suggett, D.J.| Voolstra, C.R.| Aranda, M.| Duarte, C.M. Global Change Biology

Translating the 10 golden rules of reforestation for coral reef restoration
Quigley, K.M.| Hein, M.| Suggett, D.J. Conservation Biology

Hypoxia as a physiological cue and pathological stress for coral larvae
Alderdice, R.| Pernice, M.| Cárdenas, A.| Hughes, D.J.| Harrison, P.L.| Boulotte, N.| Chartrand, K.| Kühl, M.| Suggett, D.J.| Voolstra, C.R. Molecular Ecology

Horizon scan of rapidly advancing coral restoration approaches for 21st century reef management
Suggett, D.J.| Van Oppen, M.J.H. Emerging Topics in Life Sciences

Heat stress reduces the contribution of diazotrophs to coral holobiont nitrogen cycling
Rädcker, N.| Pogoreutz, C.| Gegner, H.M.| Cárdenas, A.| Perna, G.| Geißler, L.| Roth, F.| Bougoure, J.| Guagliardo, P.| Struck, U.| Wild, C.| Pernice, M.| Raina, J.-B.| Meibom, A.| Voolstra, C.R. ISME Journal

Mucospheres produced by a mixotrophic protist impact ocean carbon cycling
Larsson, M.E.| Bramucci, A.R.| Collins, S.| Hallegraeff, G.| Kahlke, T.| Raina, J.-B.| Seymour, J.R.| Doblin, M.A. Nature Communications

Experiment Degree Heating Week (eDHW) as a novel metric to reconcile and validate past and future global coral bleaching studies
Leggat, W.| Heron, S.F.| Fordyce, A.| Suggett, D.J.| Ainsworth, T.D. Journal of Environmental Management

The diversity and ecology of Symbiodiniaceae: A traits-based review
Nitschke, M.R.| Rosset, S.L.| Oakley, C.A.| Gardner, S.G.| Camp, E.F.| Suggett, D.J.| Davy, S.K. Advances in Marine Biology

Dynamic change in an ocean desert: Microbial diversity and trophic transfer along the 110 °E meridional in the Indian Ocean
Raes, E.J.| Hörstmann, C.| Landry, M.R.| Beckley, L.E.| Marin, M.| Thompson, P.| Antoine, D.| Focardi, A.| O'Brien, J.| Ostrowski, M.| Waite, A.M. Deep-Sea Research Part II: Topical Studies in Oceanography

Predictability of thermal fluctuations influences functional traits of a cosmopolitan marine diatom
Gill, R.L.| Collins, S.| Argyle, P.A.| Larsson, M.E.| Fleck, R.| Doblin, M.A. Proceedings of the Royal Society B: Biological Sciences

Adaptation to an amoeba host drives selection of virulence-associated traits in *Vibrio cholerae*
Hoque, M.M.| Noorian, P.| Espinoza-Vergara, G.| Manuneechi Cholan, P.| Kim, M.| Rahman, M.H.| Labbate, M.| Rice, S.A.| Pernice, M.| Oehlers, S.H.| McDougald, D. ISME Journal

Publications

C3 publications between Jan - Dec 2022

Biogeographical and seasonal dynamics of the marine Roseobacter community and ecological links to DMSP-producing phytoplankton
O'Brien, J. | McParland, E.L. | Bramucci, A.R. | Siboni, N. | Ostrowski, M. | Kahlke, T. | Levine, N.M. | Brown, M.V. | van de Kamp, J. | Bodrossy, L. | Messer, L.F. | Petrou, K. | Seymour, J.R.
ISME Journal

Essential outcomes for COP26
Smith, P. | Beaumont, L. | Bernacchi, C.J. | Byrne, M. | Cheung, W. | Conant, R.T. | Cotrufo, F. | Feng, X. | Janssens, I. | Jones, H. | Kirschbaum, M.U.F. | Kobayashi, K. | LaRoche, J. | Luo, Y. | McKechnie, A. | Penuelas, J. | Piao, S. | Robinson, S. | Sage, R.F. | Sugget, D.J. | Thackeray, S.J. | Way, D. | Long, S.P. Global Change Biology

Disentangling compartment functions in sessile marine invertebrates
Hughes, D.J. | Raina, J.-B. | Nielsen, D.A. | Suggett, D.J. | Kühl, M.
Trends in Ecology and Evolution

Can seagrass modify the effects of ocean acidification on oysters?
Garner, N. | Ross, P.M. | Falkenberg, L.J. | Seymour, J.R. | Siboni, N. | Scanes, E.
Marine Pollution Bulletin

Unassembled cell wall proteins form aggregates in the extracellular space of *Chlamydomonas reinhardtii* strain UVM4
Barolo, L. | Commault, A.S. | Abbriano, R.M. | Padula, M.P. | Kim, M. | Kuzhiumparambil, U. | Ralph, P.J. | Pernice, M.
Applied Microbiology and Biotechnology

Microbial dimethylsulfoniopropionate (DMSP) cycling in the ultraoligotrophic eastern Indian Ocean
O'Brien, J. | Focardi, A. | Deschaseaux, E.S.M. | Petrou, K. | Ostrowski, M. | Beckley, L.E. | Seymour, J.R.
Deep-Sea Research Part II: Topical Studies in Oceanography

Microbial dimethylsulfoniopropionate (DMSP) cycling in the ultraoligotrophic eastern Indian Ocean
O'Brien, J. | Focardi, A. | Deschaseaux, E.S.M. | Petrou, K. | Ostrowski, M. | Beckley, L.E. | Seymour, J.R.
Deep-Sea Research Part II: Topical Studies in Oceanography

Impacts of nursery-based propagation and out-planting on coral-associated bacterial communities
Strudwick, P. | Seymour, J. | Camp, E.F. | Edmondson, J. | Haydon, T. | Howlett, L. | Le Reun, N. | Siboni, N. | Suggett, D.J.
Coral Reefs

Temporal Variation in the Microbiome of Tropical and Temperate Octocorals
Haydon, T.D. | Suggett, D.J. | Siboni, N. | Kahlke, T. | Camp, E.F. | Seymour, J.R.
Microbial Ecology

Adoption of coral propagation and out-planting via the tourism industry to advance site stewardship on the northern Great Barrier Reef
Howlett, L. | Camp, E.F. | Edmondson, J. | Edmondson, J. | Agius, T. | Hosp, R. | Coulthard, P. | Edmondson, S. | Suggett, D.J.
Ocean and Coastal Management

Proteome metabolome and transcriptome data for three Symbiodiniaceae under ambient and heat stress conditions
Camp, E.F. | Kahlke, T. | Signal, B. | Oakley, C.A. | Lutz, A. | Davy, S.K. | Suggett, D.J. | Leggat, W.P.
Scientific Data

Chemotaxis may assist marine heterotrophic bacterial diazotrophs to find microzones suitable for N₂ fixation in the pelagic ocean
Hallström, S. | Raina, J.-B. | Ostrowski, M. | Parks, D.H. | Tyson, G.W. | Hugenholtz, P. | Stocker, R. | Seymour, J.R. | Riemann, L.
ISME Journal

Diverse RNA Viruses Associated with Diatom, Eustigmatophyte, Dinoflagellate, and Rhodophyte Microalgae Cultures
Charon, J.| Kahlke, T.| Larsson, M.E.| Abbriano, R.| Commault, A.| Burke, J.| Ralph, P.| Holmes, E.C.
Journal of Virology

Toward bio-optical phenotyping of reef-forming corals using Light-Induced Fluorescence Transient-Fast Repetition Rate fluorometry
Suggett, D.J.| Nitschke, M.R.| Hughes, D.J.| Bartels, N.| Camp, E.F.| Dileria, N.| Edmondson, J.| Fitzgerald, S.| Grima, A.| Sage, A.| Warner, M.E.
Limnology and Oceanography: Methods

Species-specific elementomes for scleractinian coral hosts and their associated Symbiodiniaceae
Grima, A.J.| Clases, D.| Gonzalez de Vega, R.| Nitschke, M.R.| Goyen, S.| Suggett, D.J.| Camp, E.F.
Coral Reefs

Global Phylogeography of Marine Synechococcus in Coastal Areas Reveals Strong Community Shifts
Doré, H.| Leconte, J.| Guyet, U.| Breton, S.| Farrant, G.K.| Demory, D.| Ratin, M.| Hoebeke, M.| Corre, E.| Pitt, F.D.| Ostrowski, M.| Scanlan, D.J.| Partensky, F.| Six, C.| Garczarek, L.
mSystems

Techno-economic analysis of cyanobacterial PHB bioplastic production
Price, S.| Kuzhiumparambil, U.| Pernice, M.| Ralph, P.
Journal of Environmental Chemical Engineering

Effects of harvesting on morphological and biochemical characteristics of microalgal biomass harvested by polyacrylamide addition, pH-induced flocculation, and centrifugation
Kuzhiumparambil, U.| Labeeuw, L.| Commault, A.| Vu, H.P.| Nguyen, L.N.| Ralph, P.J.| Nghiem, L.D.
Bioresource Technology

Widespread oxyregulation in tropical corals under hypoxia
Hughes, D.J.| Alexander, J.| Cobbs, G.| Kühl, M.| Cooney, C.| Pernice, M.| Varkey, D.| Voolstra, C.R.| Suggett, D.J.
Marine Pollution Bulletin

Greater functional diversity and redundancy of coral endolithic microbiomes align with lower coral bleaching susceptibility
Cárdenas, A.| Raina, J.-B.| Pogoreutz, C.| Räddecker, N.| Bougoure, J.| Guagliardo, P.| Pernice, M.| Voolstra, C.R.
ISME Journal

Phenoplate: An innovative method for assessing interacting effects of temperature and light on non-photochemical quenching in microalgae under chemical stress
Herdean, A.| Sutherland, D.L.| Ralph, P.J.
New Biotechnology

Heterogeneous Growth Enhancement of *Vibrio cholerae* in the Presence of Different Phytoplankton Species
King, K.| Bramucci, A.R.| Labbate, M.| Raina, J.-B.| Seymour, J.R.
Applied and Environmental Microbiology

Micronutrient content drives elementome variability amongst the Symbiodiniaceae
Camp, E.F.| Nitschke, M.R.| Clases, D.| Gonzalez de Vega, R.| Reich, H.G.| Goyen, S.| Suggett, D.J.
BMC Plant Biology

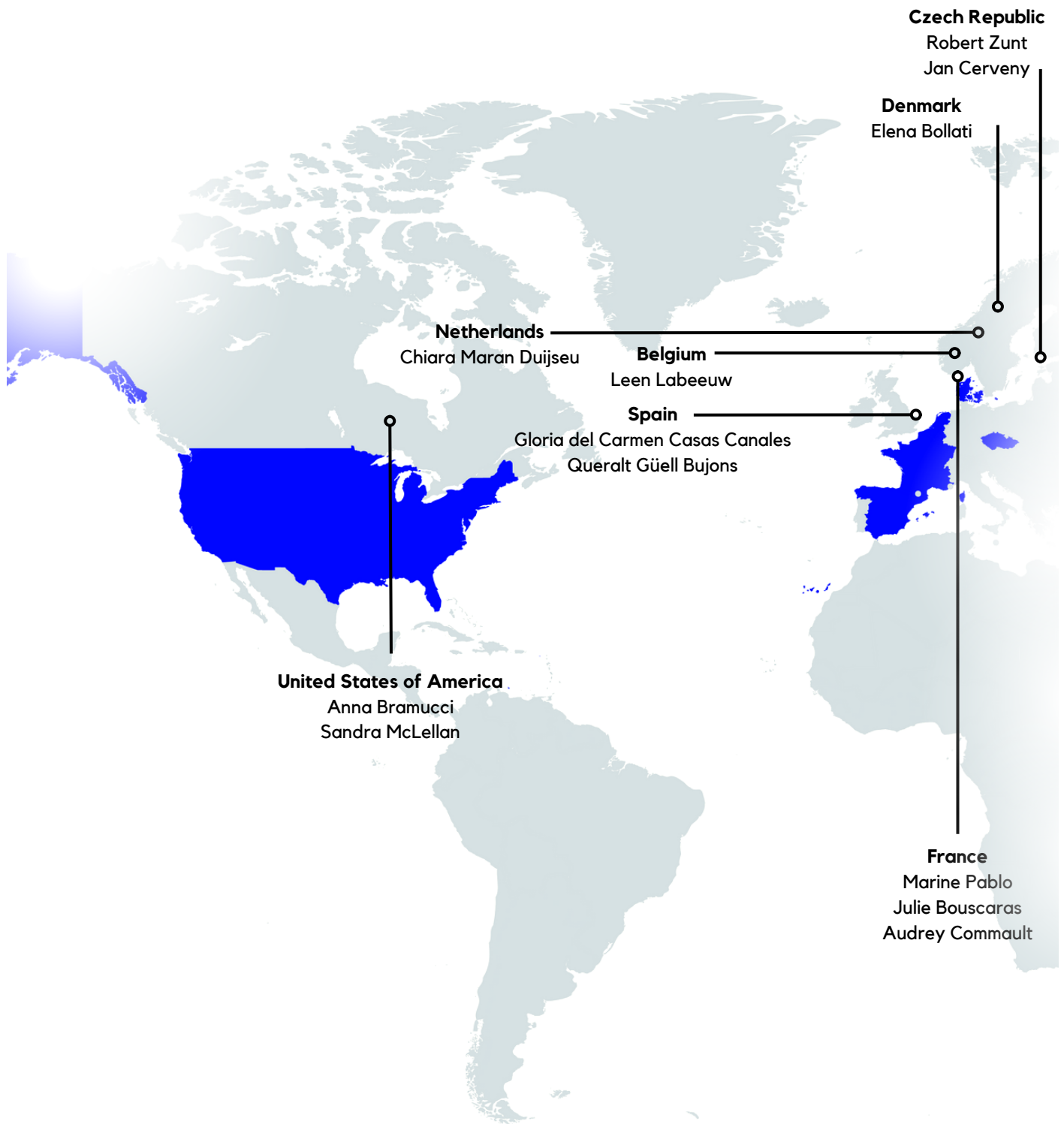
Combined impacts of natural recruitment and active propagation for coral population recovery on the Great Barrier Reef
Roper, C.D.| Camp, E.F.| Edmondson, J.| Suggett, D.J.
Marine Ecology Progress Series



Climate
Change
Cluster

Visitors

Throughout 2022, we had **21 visitors from 9 different countries** contributing to C3's research with marine ecosystems that helped inform strategic decisions.





New Zealand
Nicholas Hill

Australia
Richard Adamson
Samantha Goyen
Tim O'Meara
Cassidy Jo Hayward
David Hughes
Valentina Hurtado McCormick
Martin Ostrowski
Milan Szabo
Michaela Larrson



Partnerships

Working collaboratively with industry, community, and research partners, C3 helps deliver strategic commercial and research with real-world impact.

Piping Hot

Australian surf wear brand Piping Hot has partnered with C3 to create a new sustainable fibre from seaweed. With a strong commitment to sustainability, Piping Hot has commissioned C3 to research the use of a new material to be used in Piping Hot's clothing.



Coral Nurture Program

Future Reefs has partnered with the Coral Nurture Program, an organisation actively protecting the essential parts of the Great Barrier Reef. The program places emphasis on 'stewardship', and the responsibility we have to protect the health of our natural assets by working collaboratively with tourism and community action groups.

Phenomics Laboratory

The Phenomics Laboratory gives C3 new capabilities for high throughput screening, massively increasing our capability to characterise new strains. This will fuel new discoveries within biotech, agriculture, and environmental sectors.





Pure Ocean Foundation

Working with the 'Pure Ocean Foundation', C3's international collaboration has leveraged an opportunity to fund the 'Reef Reborn' program. This project aims to conserve marine biodiversity and increase knowledge for the restoration of fragile marine ecosystems. Continuing this partnership allows C3 to continue investing in contributing to the fight against climate change.



Marine Bioproducts Cooperative Research Centre

The MBCRC's vision is targeting the support of blue ecologies with the input of green technologies, allowing for a blue economy. C3 and the MBCRC have collaborated in a recent research project titled 'Overcoming propagule supply bottlenecks for seaweed production'. Redesigning systems for how we grow seaweed can reduce carbon emissions and increase profits.



V2 Food

C3 continued its partnership with v2food in 2022. Aiming to be a carbon negative company, v2 has enlisted the work of our researchers at C3. C3 has been working in collaboration to explore the ways in which algae can bring v2 closer to their goal of carbon negativity, all while producing Australia's number 1 plant-based meat.



Awards & Achievements

Celebrating some of our members' awards and achievements.



Rachael Scott

Green Gown Award – Research Impact Student

Rachel was awarded the Green Gown Award for her research on the Coral Nurture Program, focusing on the cost effectiveness of the program's processes. Her findings contribute to developing the feasibility of coral rehabilitation of the Great Barrier Reef, and is essential to preserving and protecting the health of our reefs and associated industries.



Martina Doblin

Fulbright Fellowship

Martina completed her Fulbright Fellowship in August 2022. During her time, she spent time at the Scripps Institution of Oceanography and the University of Southern California. During her time, Martina studied new imaging and modelling techniques, published a paper on microbes in Global Change Biology, and presented her research around California and Rhode Island.



Jen Matthews

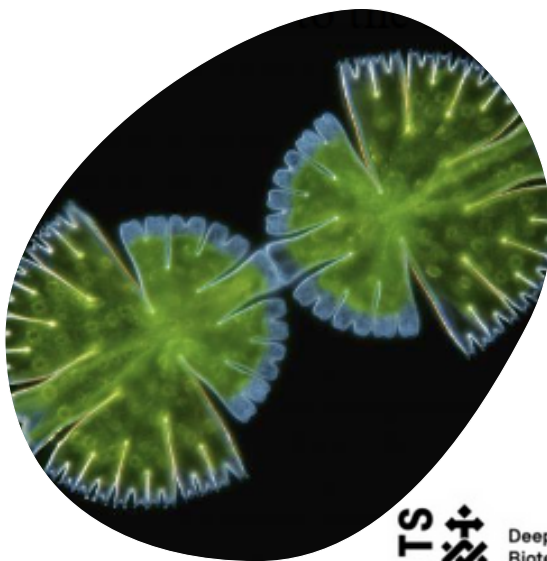
Lead Editor for a Special Issue on Holobiont Interactions in Frontiers of Ecology and Evolution

Jen's top 10 research topic for 2022 aims to explore holobionts, a framework to describe complex host/microbiota relationships. This concept is essential to understand the dynamics that contribute to coral health and its role in the ecosystem.

Green Genie Launch

Green Genie captures carbon emissions with a bioreactor device packaged inside a standard shipping container. With the ability to capture 40x the carbon emissions of trees, this innovation can help explore new options for reducing carbon emissions in industry and as a wastewater treatment device.

Attended by the Federal Minister for the Department of Energy and Water, Tanya Plibersek, and UTS Vice Chancellor Andrew Parfitt, the Green Genie has been launched as a test-run on the UTS campus, next to the Alumni Green.



Deep Green Biotech Hub

Working closely with the Deep Green Biotech Hub, C3 helps support local Biotech startups with the Green Light Program. Designed in 2018, this program has been helping bring new algae-based products to market.

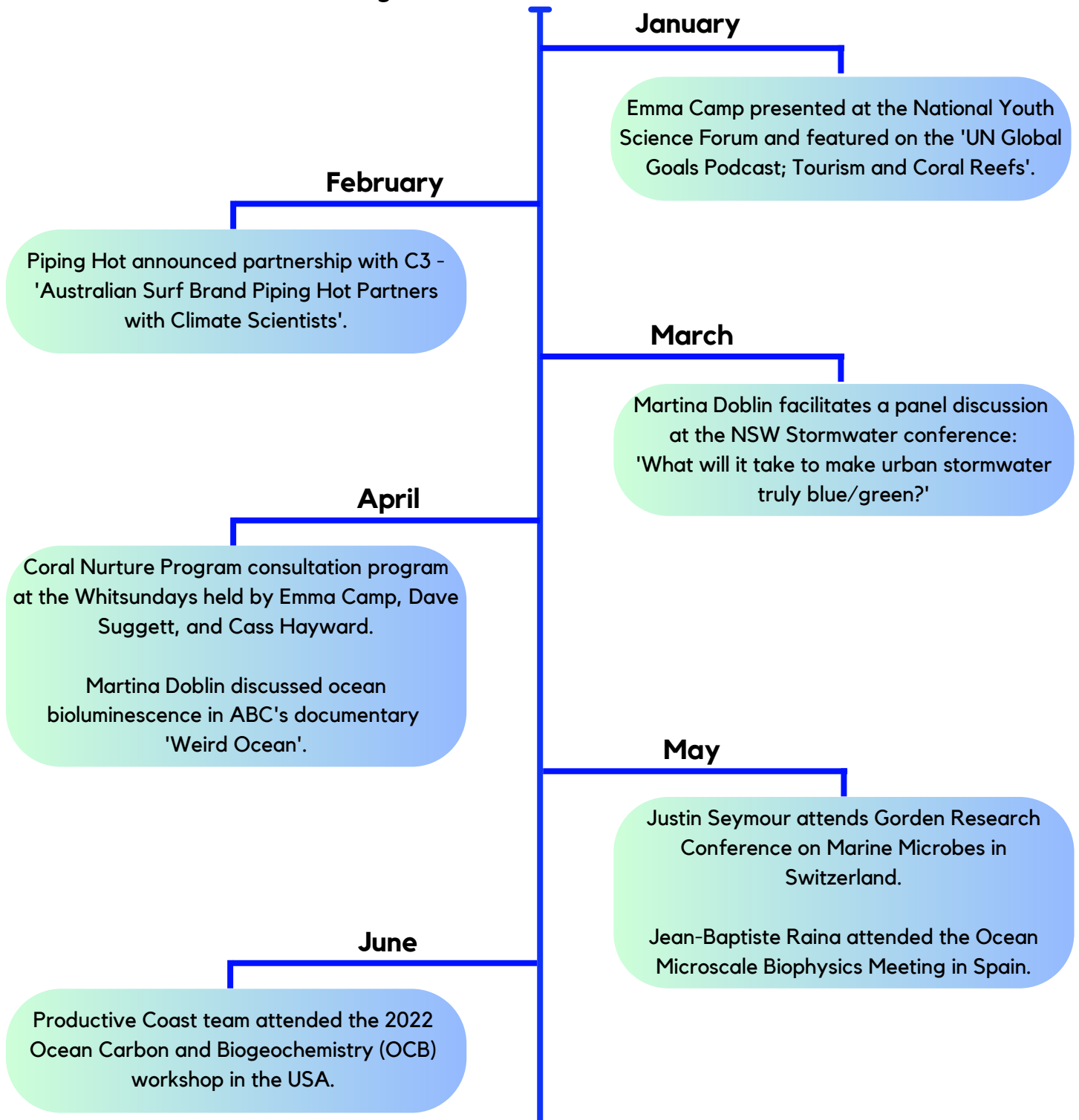
Entrepreneurs and small-to-medium enterprises are encouraged to introduce their innovative ideas for algae-based climate mitigation products and services. Within the program, they are provided access to networks, funding, and expertise for their next steps.

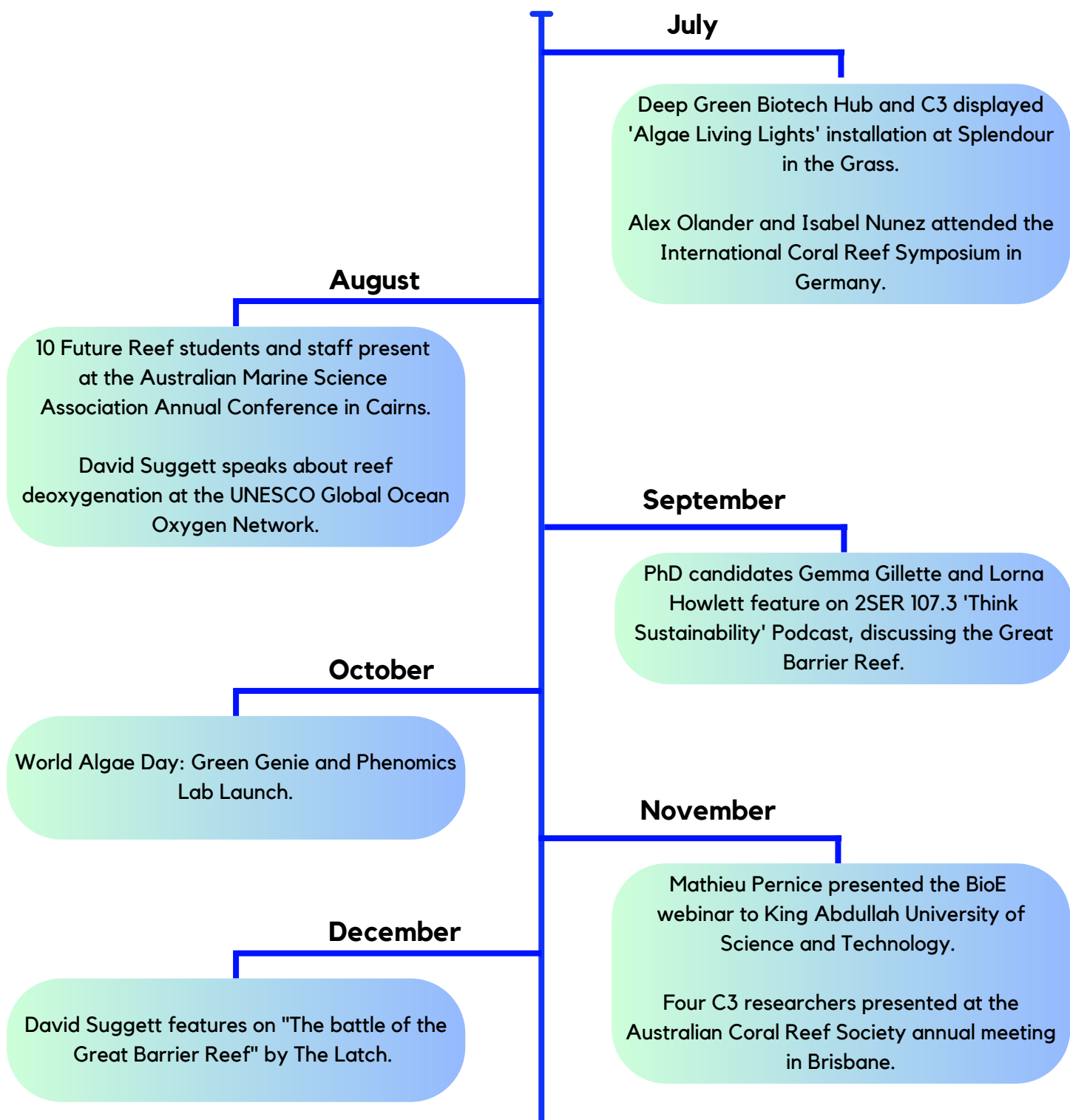


10 patents filed by C3 in 2022

Engagements

Engagement with community, industry, and institutions allows C3 to cultivate its reputation internationally, as well as informing the wider community of the climate crisis and its solutions. C3's members have appeared in person, online, on radio and television throughout 2022.







Climate
Change
Cluster

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