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		SCAR SRP	Ant-ICON
		Person Responsible:	Mercedes Santos
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Integrated Science to Inform Antarctic and Southern Ocean Conservation (Ant-ICON) 2020-22 Report

Summary

Focussing on key areas of interest to the CEP and SC-CAMLR, Ant-ICON aims to contribute transdisciplinary policy-relevant research that (a) examines the current state and future projections of Antarctic ecosystems, species and functions, (b) studies human activities in terms of their impact, (c) explores socio-ecological connectivity and alternative approaches to Antarctic and Southern Ocean conservation, and (d) offers a synthesis of key research results for the purposes of environmental governance and policy development.

Report Authors

Mercedes (Mecha) Santos (ARG); Daniela Liggett (NZ); Aleks Terauds (Aus); Bettine van Vuuren (SA); Alvaro Soutullo (Uruguay); and by theme, (R1) Jilda Alicia Caccavo (France); (R2) Kevin A. Hughes (UK), Jasmine Lee (UK/Aus), Andrew Lowther (Norway); (R3) Daniela Liggett (NZ), Adrian Howkins (UK), Stephen Chignell (Canada); (S1) Natasha Gardiner (NZ), Neil Gilbert (NZ) & Hyoung Chul Shin (Korea).

Summary of activities from 2020-22

Since 2021, Ant-ICON has established a functioning administrative structure with a Steering Committee consisting of the leads and co-leads of the individual research themes, and have had regular meetings to ensure the sharing of information and collaboration in the organisation of Ant-ICON activities. The latter included a series of community workshops and the development of a fellowship scheme to build capacity and increase the policy literacy of ECRs. Ant-ICON has also contributed policy papers to the 2022 ATCM and has had a range of cutting-edge research outputs. Ant-ICON has had a prominent presence at the SCAR OSC 2022, and plans to hold a cross-theme workshop in 2023.

We **request that the Delegates approve a leadership change** (which has already been approved by the SCAR Executive), with Aleks Terauds stepping down as one of the Chief Officers and Daniela Liggett stepping into this role.

Summary Budget 2021 to 2024

	2021	2022	2023	2024
	Spent	Allocated	Request	Request
(US\$)	260	30,000	30,000	30,000

Progress and Plans

Main Activities

Activities of note are framed under three headings (a) structural and administrative efforts, (b) a series of community workshops, and (c) the development of a fellowship scheme.

(a) Structural and administrative efforts:

Ant-ICON ran a logo competition for early-career researchers that resulted in an innovative and aesthetical logo, while connecting with early-career researchers and creating awareness in the Antarctic research community about Ant-ICON's objectives. We have established an active Steering Committee and are in the process of confirming Advisory Committee memberships. We have also set up a mailing list and social media presence and have commenced building a researcher database on the SCAR website, with excellent support from the SCAR Secretariat, and in particular Rosemary Nash. Furthermore, we have consolidated a leadership team of two co-chief officers (Mercedes Santos, Argentina, and Daniela Liggett, New Zealand [still to be confirmed by the Delegates]), supported by two Deputy Chief Officers (Bettine van Vuuren, South Africa, and Alvaro Soutullo, Uruguay). A Leadership EMCR has been appointed (Jilda Caccavo, France), who works with the Chief and Deputy Chief Officers to manage the day-to-day activities of the SRP, and develop/oversee the long-term goals of the SRP. This necessitated putting out a call for and recruiting a new R1 EMCR (Svenja Halfter, NZ) to replace Jilda Caccavo as she moved into her new role on the Steering Committee. We also invited a new R1 co-lead (Nicole Trefault, Chile) to replace Heather Lynch who had to step down from her role as R1 co-lead due to other commitments.

(b) Community workshops:

In 2021, Ant-ICON ran two community-engagement meetings and a session specifically for Early-to-Mid-Career Researchers (EMCR).

In addition, we ran a series of workshops, primarily organised by the R3 team, to explore the use, conceptualisation and human experience of a selection of Antarctic regions: the McMurdo Dry Valleys, Ross Sea, South Shetland Islands and Antarctic Peninsula. Preliminary workshops were held by the R3 team in 2021 with a small group of researchers to explore how socio-ecological connectivity and interdependencies could best be captured in Ant-ICON's R3 work programme. The latter two workshops (30 March 2022 and 5 April 2022) were open online workshops with four compelling invited presentations each, followed by an active discussion. These workshops had a substantial number of participants from all continents, and will inform further work done by Ant-ICON researchers.

(c) Development of a fellowship scheme:

In collaboration with SC-ATS, Ant-ICON has worked on developing a fellowship programme for EMCRs to support capacity building and better understanding of policy processes within the Antarctic Treaty System. This fellowship will enable EMCRs to participate in ATCM/CEP and CCAMLR as part of the SCAR delegation. In return, the Ant-ICON fellow will work with a mentor/team of mentors to prepare materials to present at the meeting that they will be funded to attend (ATCM/CEP or CCAMLR). This fellowship will be announced later this year.

Major Outcomes

Three most significant outcomes to date include, (a) results from a series of community workshops, (b) policy outputs, and (c) a fellowship scheme co-developed with Ant-ICON.

(a) Workshop results

The aforementioned series of Ant-ICON community workshop stimulated thought regarding alternative approaches to Antarctic conservation and explored the notion of bioculturalism as a possible framing that recognizes the interconnected character of Antarctic socio-ecological systems and might supplement a biogeographical approach to regionally informed Antarctic environmental governance. Detailed notes from the community workshops are available on the SCAR Ant-ICON website: <https://www.scar.org/science/ant-ikon/resources/>.

The recordings of the community-engagement sessions and the EMCR sessions are available on the SCAR Ant-ICON website: <https://www.scar.org/science/ant-ikon/ant-ikon-news/>.

(b) Policy outputs:

An Information Paper (IP) was presented at the ATCM's Committee for Environmental Protection in Berlin (May 2022) that highlighted work undertaken during a SCAR Fellowship linked to Ant-ICON.

United Kingdom and Uruguay. (2022). [International response under the Antarctic Treaty System to the establishment of a non-native fly on the South Shetland Islands](#). Information Paper 25. Antarctic Treaty Consultative Meeting, 23rd May – 2 June 2022, Berlin, Germany.

In addition, IP 22 is also linked to Ant-ICON's work.

United Kingdom. (2022). [Consideration of climate change within the Antarctic Protected Areas System](#). Information Paper 22. Antarctic Treaty Consultative Meeting, 23rd May – 2 June 2022, Berlin, Germany.

(c) Fellowship scheme:

As outlined above, Ant-ICON has engaged with SC-ATS to discuss and advance the development of a fellowship scheme for EMCR to build capacity in relation to Antarctic governance, and SCAR's role in this respect. We anticipate to announce this fellowship later in 2022 and offer two fellowships – one for the CEP/ATCM, and one for the SC-CAMLR meeting – in 2023.

Future Plans

In this section, we outline Ant-ICON's engagement in the SCAR Open Science Conference (OSC) 2022 as well as plans beyond the SCAR OSC 2022.

Ant-ICON has held three sessions at the SCAR OSC 2022, one titled "Rethinking Antarctic environments and conservation" by Ant-ICON's R1 and R3, one by R2 on "Human Impacts and Sustainability", and a mini-symposium titled "How SCAR informs and guides Antarctic policy and conservation" organised by S1 and SC-ATS. The outcomes of these sessions and the thought-provoking discussions that had been had in and beyond the SCAR OSC sessions, will inform our future activities, which are briefly sketched out below.

For the mid-term, planning is underway by R1 for a monthly online seminar series featuring relevant research presentations, which bring together members of the Ant-ICON community with a particular interest in R1-related research. Particular

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emphasis will be placed on featuring research from EMCRs and to represent the global diversity of researchers contributing work relevant to R1.

Under Article 12(j) of the Protocol on Environmental Protection to the Antarctic Treaty, the Committee on Environmental Protection is tasked with reporting on the state of the Antarctic environment. However, since its establishment, the CEP has only delivered limited information at a regional level. R2 aims to support the CEP in this work by coordinating a community-led effort to deliver policy-ready information on different environmental issues across different regions of Antarctica and the Southern Ocean. The experience and expertise of Ant-ICON members will form the foundations of the project, through close collaboration with other bodies within SCAR will be required, including, e.g. SOOS, ICED and ANTOS. A presentation will be given at the SCAR OSC and two workshops are planned for late 2022.

In addition, the R2 team is working on a paper on threat management strategies for conserving Antarctic biodiversity which is nearing completion, and an Ant-ICON academic paper about the communication of the best available science to inform Antarctic policy and management is in the final stages of development.

R3 will hold an in-person workshop in Cambridge, UK, in mid-September 2022 to explore alternative approaches for Antarctic conservation and undertake comparative studies of Antarctic socio-ecological systems in the Antarctic Peninsula and the McMurdo Dry Valleys. The R3 team are working towards a publication detailing the outcomes of this workshop.

Furthermore, both R2 and R3 are involved – as researchers or collaborative partners on promising NWO-funded research consortia that examine the impacts of Antarctic tourism (see: <https://www.nwo.nl/en/news/four-new-projects-about-antarctic-tourism>).

S1 has commenced work on interrogating the research needs and interests of the CEP, with the aim of developing a guide (or similar) that clarifies why the Committee requires the stated information, how it might be presented and how the Committee might use the information in its own work. This will be tested in a Steering Committee workshop later in 2022 and more widely disseminated for feedback. A possible next step for this work includes S1 hosting a workshop with the Ant-ICON community (and other SCAR groups or interested parties) and the CEP to further synthesise and improve this 'guide' to ensure it is useful for both research and policy communities. This links to the work of R1 on developing a state of environment reporting framework. Maintaining linkages across the research themes of Ant-ICON is key, and S1 will continue to work with each of the research themes to support science-policy connections.

S1 continues to work closely with SCAR's Standing Committee on the Antarctic Treaty System (SC-ATS) to ensure effective alignment with Ant-ICON's work and the role of SC-ATS. Additionally, in August 2022, S1 has jointly organised a mini-symposium with SC-ATS as part of the SCAR Open Science Conference. The mini-symposium will address 'How SCAR informs and guides Antarctic policy and conservation'. It is aimed specifically at early career researchers, but we anticipate wide attendance. The outputs for this mini-symposium remain under discussion, but may include a publication or editorial in a relevant Antarctic journal.

To support the above activities, thematic targeted research support grants have been budgeted for (see Budget).

Finally, Ant-ICON plans to hold a cross-theme workshop in September 2023, which will facilitate cross-theme integration and coordination of activities but which will also support capacity building and share Ant-ICON's efforts with the wider Antarctic research community.

Budget

Planned use of funds for 2022 to 2024

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2022	R3 Workshop in Cambridge, UK	5,000	Daniela Liggett/ Adrian Howkins	Daniela.liggett@canterbury.ac.nz ; adrian.howkins@bristol.ac.uk
2022	Thematic targeted research support grants (R1, R2, R3, S1)	9,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz
2023	Ant-ICON/SC-ATS Fellowships	6,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz
2023	Ant-ICON cross-theme workshop	15,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz
2023	ECR Participation in the SCAR Biology Symposium	5,000	Kevin Hughes/ Jasmine Lee	kehu@bas.ac.uk ; jaslee45@bas.ac.uk
2023	Thematic targeted research support grants (R1, R2, R3, S1)	9,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz
2024	Ant-ICON/SC-ATS Fellowships	6,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz
2024	EMCR Support to attend the SCAR OSC	5,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz
2024	Synthesis Workshop (aligned with SCAR OSC)	15,000	Mercedes Santos/ Daniela Liggett	msantos@apn.gob.ar ; daniela.liggett@canterbury.ac.nz

Additional detail on funds usage and desired results/outcomes

Due to the COVID-19 pandemic and related national and international lockdowns, and the challenges they brought for individual researchers, travel limitations, and competing pressures, Ant-ICON has had minimal spend over the 2021-2022 period.

With the Ant-ICON-SCATS fellowship commencing in 2023, and a couple of in-person/hybrid workshops planned, we are looking at greater expenditure in the next couple of years, and would like to request funds to be carried forward into 2023 to support these activities, which were originally envisioned to be undertaken in 2022.

Percentage of the budget to be used for support of early-career researchers

2022: 50%

2023: 50%

2024: 50%

Percentage of the budget to be used for support of researchers from countries with developing Antarctic programmes

2022: 25%

2023: 25%

2024: 25%

Membership

Leadership (Steering Committee)

Note proposal for Aleks Terauds to be replaced by Daniela Liggett as one of the Chief Officers.

Role	First Name	Last Name	Affiliation	Country	Primary Language	Email	Date Started
CO	Mecha	Santos	Instituto Antártico Argentino	Argentina	Spanish	msantos@apngob.ar	Sep 2020
CO	Daniela	Liggett	University of Canterbury	New Zealand	English	Daniela.liggett@canterbury.ac.nz	Aug 2022 (TBC)
Deputy CO	Bettine	van Vuuren	University of Johannesburg	South Africa	English	bettinev@uj.ac.za	Sep 2020
Deputy CO	Alvaro	Soutullo	Universidad de la Republica	Uruguay	Spanish	a.soutullo@gmail.com	Sep 2020
Lead EMCR	Jilda Alicia	Caccavo	Institute Pierre-Simon Laplace	France	English	ergo@jildacaccavo.com	Jun 2021
Theme R1 Lead	Nicole	Trefault	Universidad Mayor	Chile	Spanish	nicole.trefault@umayor.cl	Jun 2022
Theme R1 Lead	Antonio	Quesada	Universidad Autónoma de Madrid	Spain	Spanish	antonio.quesada@uam.es	Jan 2021
Theme R1 EMCR	Svenja	Halfter	NIWA	New Zealand	English	svenja.halter@niwa.co.nz	Jun 2022
Theme R2 Lead	Kevin	Hughes	BAS	UK	English	kehu@bas.ac.uk	Sep 2020
Theme R2 Lead	Andy	Lowther	Norwegian Polar Institute	Norway	English	andrew.lowther@npolar.no	Sep 2020
Theme R2 EMCR	Jasmine	Lee	BAS	UK	English	jaslee45@bas.ac.uk	Sep 2020
Theme R3 Lead	Daniela	Liggett	University of Canterbury	New Zealand	English	daniela.liggett@canterbury.ac.nz	Sep 2020
Theme R3 Lead	Adrian	Howkins	University of Bristol	UK	English	adrian.howkins@bristol.ac.uk	Sep 2020
Theme R3 EMCR	Stephen	Chignell	University of British Columbia	Canada	English	steve.chignell@ubc.ca	Jan 2021
Theme S1 Lead	Hyoung Chul	Shin	Korea Polar Research Institute	South Korea	Korean	hcshin@kopri.re.kr	Sep 2020
Theme S1 Lead	Neil	Gilbert	NZ Antarctic Science Platform	New Zealand	English	neil@constantiaconsulting.net	Sep 2020
Theme S1 EMCR	Natasha	Gardiner	University of Canterbury	New Zealand		natasha.gardiner@pg.canterbury.ac.nz	Sep 2020

Early-to-mid-career researchers are identified as EMCR in this table.

Additional information (optional)

Notable Papers

1. León, M.R.D, Hughes, K.A., Morelli, E., Convey, P. (2021). [International response under the Antarctic Treaty System to the establishment of a non-native fly in Antarctica](#). Environmental Management, 67.

This article is the output of collaborative work undertaken at BAS during a SCAR Fellowship through Ant-ICON: United Kingdom and Uruguay. The work presents options toward development of a non-native species management plan for King George Island.

2. Hughes, K.A., Convey, P., Turner, J. (2021). [Developing resilience to climate change impacts in Antarctica: An evaluation of Antarctic Treaty System protected area policy](#). Environmental Science & Policy, 124, 12-22.

Tying into the objectives of Research Theme 2, this research identifies how Antarctic Specially Protected Areas (ASPAs) can contribute to developing resilience to climate change impacts for Antarctic ecosystems. Whilst climate resilience is currently little considered in the development of ASPA management plans or ASPA designation, there are opportunities to do so in future.

3. Bokhorst, S., Convey, P., van Logtestijn, R., Aerts, R. (2022). [Temperature impact on the influence of penguin-derived nutrients and mosses on non-native grass in a simulated polar ecosystem](#). Global Change Biology, 28(3), 816-828.

*One of Research Theme 1's key objectives is to understand how Antarctic communities will cope with future change. This research examined how nitrogen input, presence of native moss species, and warming influences reproduction and germination of the non-native grass *Agrostis capillaris*, suggesting that with warming invasive plants may become limited by nitrogen input rather than temperature.*

4. Quiroga, M.V., Valverde, A., Mataloni, G., Casa, V., Stegen, J.C., Cowan, D. (2022). [The ecological assembly of bacterial communities in Antarctic wetlands varies across levels of phylogenetic resolution](#). Environmental Microbiology.

This study examined ecological assembly of Antarctic bacterial communities from a wetland complex, demonstrating that phylogenetic resolution is important for detecting assembly processes. Assessing community assemblage processes at different resolutions is key to improve our understanding of Antarctic microbial ecology and thus be able to forecast the status of these communities in future (an objective of Research Theme 1).

5. Hwengwere, K., Paramel, N.H., Hughes, K.A., Peck, L.S., Clark, M.S., Walker, C.A. (2022). [Antimicrobial resistance in Antarctica: is it still a pristine environment?](#) Microbiome, 10, 71.

Identifying the risks of human activities is one of Research Theme 2's objectives and this study, comprising a literature review of antimicrobial resistance (AMR) in Antarctica, found clear evidence of higher levels of AMR around research stations. AMR levels within birds and seals still appear to be very low.

6. Soutullo, A., Machado-Gaye, A.L., Juri, E. (2022). [Managing cumulative impacts and protected areas in Antarctica: what can we learn from the rest of the world?](#) Polar Research, 41, 8432.

Relevant to all of Ant-ICON, this piece draws lessons from protected area management in the rest of the world to examine how cumulative impacts might be better managed in Antarctica. Two primary concepts to consider are adaptive management and empowering protected area managers.

7. Lee, J.R., Waterman, M.J., Shaw, J.D., Bergstrom, D.M., Lynch, H.J., Wall, D.H., Robinson, S.A. (2022). [Islands in the ice: Potential impacts of habitat transformation on Antarctic biodiversity.](#) Global Change Biology.

In line with Research Theme 1's objectives to understand the current and future state of Antarctic biodiversity, this piece proposes hypotheses on how climate-induced habitat transformation will impact Antarctic biodiversity and identifies key research questions going forward that will help to reduce some of the uncertainties.

8. Chignell, S. M., A. Howkins, P. Gullett, and A. G. Fountain. 2022. Patterns of interdisciplinary collaboration resemble biogeochemical relationships in the McMurdo Dry Valleys, Antarctica: a historical social network analysis of science, 1907–2016. Polar Research 41: 8037. doi:[10.33265/polar.v41.8037](#).

This study traces the history of environmental science in the McMurdo Dry Valleys using bibliometrics and social network analysis. As a case study, it adds nuance and depth to continental-scale studies of scientific collaboration in Antarctica, and raises interesting questions about the role of the material environment in the development of scientific networks, and their dynamic interaction with socio-cultural and political factors. This contributes to Ant-ICON's objective of providing historical socio-ecological data and insights to inform future decision-making and policy development.

9. Howkins, A., S. Chignell, and A. Fountain. 2021. Vanda Station, Antarctica: a biography of the Anthropocene. Journal of the British Academy 9s6: 61–89. doi:[10.5871/jba/009s6.061](#).

This article uses the history of New Zealand's Vanda Station in Antarctica as a case study of the inseparability of human history and environmental change in the age of the Anthropocene. This contributes to Ant-ICON's objective to better understand the dynamic socio-ecological factors underlying Antarctic science and environmental management.

10. Chignell, S. M., M. E. Myers, A. Howkins, and A. G. Fountain. 2021. Research sites get closer to field camps over time: Informing environmental management through a geospatial analysis of science in the McMurdo Dry Valleys, Antarctica. PLOS ONE 16. Public Library of Science: e0257950. doi:[10.1371/journal.pone.0257950](#).

This study examines the relationship between field camp placement and scientific production in the McMurdo Dry Valleys. It found that scientific output does not necessarily correspond to the number of field camps, and constructing a field

camp does not always lead to a subsequent increase in research in the local area. The results contribute to Ant-ICON's goal of understanding the impacts of human impacts in Antarctica, and offers insights that can inform conservation and field camp planning.

Furthermore, a paper providing an overview of Ant-ICON's objectives and the rationale for the work to be undertaken is in the final stages of review for publication in Antarctic Science. It is titled Ant-ICON – 'Integrated Science to Inform Antarctic and Southern Ocean Conservation': a new SCAR Scientific Research Programme'.

Direct support from outside organisations received for your activities

1. Substantive support has been received by R3 to hold a workshop in Cambridge, UK. Adrian Howkins has obtained a *British Academy Knowledge Frontiers* grant (£50,000) grant for a related project, titled "Antarctic Mosaic: An Environmental History of the McMurdo Dry Valleys".

Major collaborations your SRP has with other SCAR groups and with organisations/groups beyond SCAR

To ensure transparency, information flow and collaboration, Ant-ICON is in the process of establishing an Advisory Committee with representation from each of the groups named below:

Within SCAR

1. Standing Committee on the Antarctic Treaty System (SC-ATS)
2. Standing Committee on the Humanities and Social Sciences (SC-HASS)
3. SRP Near-term Variability and Prediction of the Antarctic Climate System (AntClim^{Now})
4. SRP INSTabilities & Thresholds in ANTArctica (INSTANT)
5. SCAR Life Sciences Group
6. SCAR Physical Sciences Group
7. SCAR Geosciences Group
8. SCAR Standing Committee on Antarctic Data Management
9. SCAR Standing Committee on Antarctic Geographic Information
10. SCAR Standing Committee on Humanities and Social Sciences
11. SCAR Expert Group on Antarctic Biodiversity Informatics
12. SCAR Expert Group on Birds and Marine Mammals
13. SCAR Action Group on Geological Heritage and Geoconservation

Outside SCAR

1. Committee for Environmental Protection to the Antarctic Treaty (CEP)
2. SC-CAMLR
3. International Association of Antarctic Tour Operators (IAATO)
4. Council of Managers of National Antarctic Programs (COMNAP)
5. Association of Polar Early Career Scientists (APECS)
6. Antarctic and Southern Ocean Coalition (ASOC)
7. Integrating Climate and Ecosystem Dynamics in the Southern Ocean (ICED)

8. Southern Ocean Observing System (SOOS)
9. United Nations Decade of Ocean Science for Sustainable Development

Outreach, communication and capacity building activities

- (a) Website presence (<https://www.scar.org/science/ant-icon/home/>), with resources providing an overview of workshop results as well as a database of affiliated researchers
- (b) The Ant-ICON presentation (Implementation Plan) is available for download at <https://scar.org/scar-library/search/science-4/research-programmes/ant-icon/5244-ant-icon-overview/>
- (c) Ant-ICON mailing list through SCAR's mailman listserv
- (d) Social media presence
- (e) Logo contest
- (f) Community workshops

Contributions to equality, diversity, and inclusion (EDI)

A new role was created on the SC of Leadership EMCR, working with the Chief and Deputy Chief Officers to manage the day-to-day activities of the SRP, and develop / carry out long-term goals of the SRP

SCAR Fellowship Reviewers

(As part of SCAR's Capacity Building efforts, such as the Fellowships and Visiting Professor Awards, we are looking for people from all the SCAR groups including SRPs to form a 'review panel', so if applications in your field are submitted we have people to contact to help assess relevant applications. Please list one or more people (name and email address) from your SRP who would be willing to serve as reviewers for the next few years, along with 1-3 keywords on their principal expertise).

First Name	Last Name	E-mail	Principal Expertise
Daniela	Liggett	Daniela.liggett@canterbury.ac.nz	Human engagement; geopolitics; governance; tourism; environmental management
Jilda	Caccavo	ergo@jildacaccavo.com	Population biology, fisheries management, genomics
Svenja	Halfter	svenja.halter@niwa.co.nz	Plankton ecology, biogeochemistry, sea ice