State of the Antarctic Ecosystem (AntEco)
2016-2017 Report

Report Authors: Jan Strugnell, Huw Griffiths, Don Cowan, Anton van de Putte, Aleks Terauds, Conxita Avila, Stefano Schiaparelli, Guido di Prisco, Andres Barbosa Alcon, Craig Cary, Annick Wilmotte, Alison Murray, Angelika Brandt, Pete Convey

Summary of activities from 2016-17 and any other important issues or factors (<150 words):

AntEco recognises the importance of the SCAR Biology Symposium as a major opportunity to bring together the community and facilitate workshops and collaborations. We have concentrated our limited funds on travel support for 35 participants (from 13 countries) with particular attention to less well-represented SCAR members and early career researchers. We also part-sponsored an APECS meeting at SCAR Biology and Polar Gordon Research Conference and Gordon Research Seminar.

Recommendations that EXCOM and Scientific Group Chief Officers should consider (if any):

We, the AntEco steering committee, believe that the community needs to start planning for the next generation of biological themed SRPs. To this end we will hold a discussion around this topic at the SCAR Biology Conference.
Progress and Plans:

Major Activities and Significant Progress from the past year (<500 words):

- SCAR Biology Conference planning
- SCAR OSC 2018 planning and sessions submitted
- A report on the major findings of the SO-AntEco expedition to the South Orkney Islands MPA has been submitted to CCAMLR.

Major Future Initiatives and Actions, including rough timeline, for at least the next 2 years (<500 words):

- SCAR Biology
- Planning for the next OSC
- Developing ideas for a synthesis products and meetings (to be discussed at SCAR Biology Symposium during the AntEco public session)

Please list any new outputs and deliverables (including publications and products that your group feels are part of your achievements):

The AntEco community has published over 100 scientific papers in the last 12 months. Some highlights are listed below with others contributed by our members listed in Appendix 1.


Waller, C. L., Griffiths, H. J., Waluda, C. M., Thorpe, S. E., Loaiza, I., Moreno, B., ... & Hughes, K. A. (2017). Microplastics in the Antarctic marine system:


**SCAR ANTOS**

Antarctic Near-shore and Terrestrial Observation System (ANTOS) started out as a SCAR Action Group in August 2014. The group’s aim is to coordinate biologically focused data collection that is necessary to assess environmental and biological variability and change in terrestrial and near-shore habitats across the Antarctic continent. ANTOS will recommend technical guidelines for an internationally-coordinated installation of sensor networks, and standards for long-term data collection, storage, and sharing among national programs. The ANTOS Action Group hosted a workshop at the 2016 SCAR Open Science Conference (OSC) in Kuala Lumpur, Malaysia on 21 August, 2016 that was attended by 50 researchers representing 16 countries (Argentina, Australia, Belgium, Brazil, Canada, Chile, Czech Republic, France, Germany, Italy, Japan, Korea, New Zealand, Sweden, United Kingdom, and USA). The report of this workshop is available on the website, and contains an update of ANTOS achievements during its 2 years as an action group. ANTOS was approved as an Expert group in August 2016. For more details, and to sign up to the mailing list, please visit [http://www.scar.org/antos](http://www.scar.org/antos).

**Facilitating Ex Situ Antarctic conservation: the establishment of an international Antarctic Genetic Archive (AGAr).**
Through initial support from Antarctica New Zealand and the New Zealand Antarctic Research Institute (NZARI) an international archive of Antarctic genetic diversity has been established at the University of Waikato, New Zealand. The Antarctic Genetic Archive (AGAr) has the ability to receive DNA from all types of environmental samples (soil, filtered water, tissue, plant etc.) and store and manage these samples using available barcoded archive technologies. A centralized database has been designed to capture critical meta-data that will be searchable online.

This new repository is now open to all international programs working on aspects of Antarctic environmental research thereby centralizing the archiving, protection, and distribution of Antarctic biodiversity and genetic complexity in perpetuity. It is hoped that the facility will provide full coverage of the continent and research programs underway. Simple sampling kits have also been designed to capture “samples of opportunity” from expeditions to remote regions where biologists are not present. Field researchers would be provided with preservation kits and instructions prior to going into the field. On return from the ice the kits will be sent directly to the archive for processing. Selected samples would be extracted, amplified and archived by the facility with split samples shipped to the sister facility for replication. Researchers currently with major collections are also encouraged to deposit selected samples for archiving. The archive has been designed specifically to make available unique DNA samples from remote areas of the continent to any Antarctic researchers thereby facilitating extremely difficult comparative studies and reducing the direct and indirect impacts need to revisit already sampled sites.

**Significant Deviations from the Implementation Plan, if any:**

No significant deviations from plan, but the programme has been extended by two years.

**Steps taken to address individual points from your External Review, if any:**

- Brought an Asian member onto steering committee (Japan)
- Brought a South American member onto steering committee (Argentina)
- Targeted funding to nations with less-well developed Antarctic programmes
- Encouraging/requesting that funding recipients acknowledge AntEco in their presentations and publications
If your SRP produces data, please report any new data generated and links to inclusions to the Antarctic Master Directory, etc.

AntEco encourages our programme members to include their data in appropriate databases rather than specifically funding data generation. Examples of newly accession data highlighted from our members are as follows:

Dataset on Antarctic and sub-Antarctic intertidal organisms from Waller et al., 2016 submitted to biodiversity.aq
(http://ipt.biodiversity.aq/resource?r=bas_intertidal)

The draft genome of the Antarctic cyanobacterium *Phormidesmis priestlyii* ULC007 was deposited at DDBJ/ENA/GenBank under the accession MPPI00000000.

Pessi et al. (2016) data: Full 16S rRNA gene sequences obtained in this study were submitted to GenBank under the accession numbers KT753316-KT753327 (strain sequences), and KT753328-KT753400 (representative sequences of the OTUs observed by pyrosequencing)


ipt.biodiversity.aq

data.biodiversity.aq
### Budget

#### Planned use of funds for 2017 and 2018

<table>
<thead>
<tr>
<th>Month/Year (MM-YY)</th>
<th>Purpose/Activity</th>
<th>Amount (in USD)</th>
<th>Contact Name</th>
<th>Contact Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>Travel support</td>
<td>19500</td>
<td>Huw &amp; Jan</td>
<td><a href="mailto:jan.strugnell@jcu.edu.au">jan.strugnell@jcu.edu.au</a> <a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a></td>
</tr>
<tr>
<td></td>
<td>SCAR Biology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>APECS meeting at SCAR Biology</td>
<td>500</td>
<td>Henrik Christiansen</td>
<td><a href="mailto:henrik.christiansen@kuleuven.be">henrik.christiansen@kuleuven.be</a></td>
</tr>
<tr>
<td>2017</td>
<td>Existing commitment for travel from 2016</td>
<td>1000</td>
<td>Melinda Waterman</td>
<td><a href="mailto:melindaw@uow.edu.au">melindaw@uow.edu.au</a></td>
</tr>
<tr>
<td>2018</td>
<td>SCAR OSC meetings</td>
<td>TBC</td>
<td>Steering Committee</td>
<td>See membership table</td>
</tr>
<tr>
<td>2018</td>
<td>SCAR OSC travel</td>
<td>TBC</td>
<td>Steering Committee</td>
<td>See membership table</td>
</tr>
<tr>
<td>2018</td>
<td>Workshop</td>
<td>5000</td>
<td>Alison Murray</td>
<td><a href="mailto:Alison.Murray@dri.edu">Alison.Murray@dri.edu</a></td>
</tr>
<tr>
<td>2018</td>
<td>Synthesis projects</td>
<td>TBC</td>
<td>Steering Committee</td>
<td>See membership table</td>
</tr>
</tbody>
</table>

**Briefly describe what the funds will be used for and what the desired results are:**

The majority of funds for 2017 are allocated to the SCAR biology symposium to ensure that the AntEco community is well represented at this very important meeting. APECS Belgium are also being sponsored for a side event at this meeting.

The funds for 2018 include a commitment to fund a workshop as part of the Ecoinformatics and Systems Biology theme (theme leader: Alison Murray, Desert Research Institute, USA). This meeting will have initial funding from AntEco but will also attract further external funding.

Other 2018 funds will be spent on attendance of the SCAR OSC and associated side meetings and synthesis projects.

**Provide an estimate on the % of the budget to be used for support of early career researchers:**

2017: 75% (including the APECS meeting)
2018: TBC
Provide an estimate on the % of the budget to be used for support of scientists from countries with developing Antarctic programmes (as listed here: http://www.scar.org/finances/contributions):

2017: ~20% (with some overlap with early career researcher funding)
2018: TBC

Linkages

Please describe any direct support you receive for your activities beyond SCAR (eg. Funds from another organization for a workshop):

2017: British Antarctic Survey Collaboration Voucher Scheme: £6,000 – to fund analysis and reporting to CCAMLR of the SO-AntEco expedition results.
See Appendix 2 for AntEco related external Science Funding (including grants and national programme funding).

Please list any major collaborations your SRP has with other SCAR groups and with organisations/groups beyond SCAR:

Don Cowan - International collaborator in NZARI-funded Collaborative Research Program: Resilience in Antarctic biota and ecosystems; 2017-2019

SCAR Biology symposium is a strong collaboration between Life Sciences, AntEco and AntERA.

Jan Strugnell (AntEco chair) and Pete Convey have been invited to give plenary lectures at the September 2017 PAIS conference in Trieste, Italy.

Members of AntEco serve on Delegations the Committee on Environmental Protection of the Antarctic Treaty. AntEco continues to work closely with the SCAR Standing Committee on the Antarctic Treaty System (SCATS) largely through Aleks Terauds.

AntEco chairs (Huw & Jan) are on the MEASO Conference and Benchmarking Steering Committee

Jan Strugnell is a member of the oversight committee for the Australian Academy of Science Early Career researcher conference ‘The Antarctic frontier: developing research in an extreme environment’.

See output list and appendix 1, especially Gutt et al (submitted) collaboration with AnTERA and AntClim21
Outreach and Capacity Building

Please describe your outreach, communication and capacity building activities. Also provide information on activities that demonstrate effectiveness as a network. (coordinating activity for your discipline/topic, i.e. mailing list and diversity of scientists involved) (<250 words):

Our Mailing list has 325 members globally.

SCAR Biology Facebook page (https://www.facebook.com/SCARBiology/) managed by AntEco team members has 518 followers and is regularly updated.

Organisation of symposium “Unlocking a continent: scientific research at the Belgian Princess Elisabeth Station, Antarctica 2008-2016” - 29/04/16 : Belgian National Committee for Geodesy and Geophysics (BNCGG) - Belgian National Committee on Antarctic Research (BNCAR) 2016 Symposium, Royal Academy of Sciences, Brussels, Organisation : Frank Pattyn, Thierry Camelbeeck and Annick Wilmotte


Wide audience conferences during the cycle ‘Cours Espace Universitaire’ in Liège, Belgium:

1) Wilmotte Annick, Le traité sur l’Antarctique, une gouvernance originale pour un continent exceptionnel, Cours Espace Universitaire, Liège, 18/02/ 2016

2) Wilmotte Annick. S’adapter pour survivre : la biodiversité terrestre antarctique, Cours Espace Universitaire, Liège, 03/03/ 2016

AE Murray has been involved educating the Planetary Science Community in the USA about value of using Antarctic Ecosystems to establish benchmarks for life detection on Ocean Worlds. This has been communicated as her role as Co-Chair of the Europa Lander Science Definition Team, through writing of a report that has been released in February 2017; and through the following presentations:


Launch of the first gallery of 3D models of Antarctic organisms on the web thanks to the collaboration between the Italian National Antarctic Museum (MNA) and Sketchfab (https://sketchfab.com/MNA). The first model can be accessed at: https://sketchfab.com/models/25c6475793e34976ae839098b6794568

**Media coverage:**
TVE (“El escarabajo verde”), La Sexta, Turner Ed., UBTV…
http://www.rtve.es/alacarta/videos/el-escarabajo-verde/escarabajo-verde-antartida-capitulo-1-paralelo-60/4041760/

**Media interviews:**
http://www.xiptv.cat/1moncat/capitol/del-baix-llobregat-a-lantartida

**Seminars and talks in schools:**
E. Ballesté: 29 May 2017 “Montserrat” School, Reus, Catalonia, to 3rd grade kids.

Several video conferences by our team from the Spanish Base Gabriel de Castilla (Deception Island). January-March 2017

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.
Anton Van de Putte antonarctica@gmail.com

Huw Griffiths hjg@bas.ac.uk

Concepcion Avila Escartin conxita.avila@ub.edu (available after Summer 2017)

Aleks Terauds aleks.terauds@gmail.com

Mary-Anne Lea maryanne.lea@utas.edu.au

Craig Cary caryc@waikato.ac.nz

Peter Convey pcon@bas.ac.uk

### Membership

<table>
<thead>
<tr>
<th>Role</th>
<th>First Name</th>
<th>Last Name</th>
<th>Affiliation</th>
<th>Country</th>
<th>Email</th>
<th>Date Started</th>
<th>Date Term is to End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Officer</td>
<td>Jan</td>
<td>Strugnell</td>
<td>James Cook University</td>
<td>AUS</td>
<td><a href="mailto:jan.strugnell@jcu.edu.au">jan.strugnell@jcu.edu.au</a></td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>Chief Officer</td>
<td>Huw</td>
<td>Griffiths</td>
<td>BAS</td>
<td>UK</td>
<td><a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a></td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>Deputy Chief Officer</td>
<td>Don</td>
<td>Cowan</td>
<td>U. Pretoria</td>
<td>RSA</td>
<td><a href="mailto:don.cowan@up.ac.za">don.cowan@up.ac.za</a></td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>Deputy Chief Officer</td>
<td>Pete</td>
<td>Convey</td>
<td>BAS</td>
<td>UK</td>
<td><a href="mailto:pcon@bas.ac.uk">pcon@bas.ac.uk</a></td>
<td>2012</td>
<td></td>
</tr>
</tbody>
</table>

* Please include any APECS representative / Junior Officers

### Other members

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Affiliation</th>
<th>Country</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleks</td>
<td>Terauds</td>
<td>AAD</td>
<td>AUS</td>
<td><a href="mailto:aleks.terauds@gmail.com">aleks.terauds@gmail.com</a></td>
</tr>
<tr>
<td>Angelika</td>
<td>Brandt</td>
<td>Senckenberg Museum</td>
<td>DE</td>
<td><a href="mailto:angelika.brandt@senckenberg.de">angelika.brandt@senckenberg.de</a></td>
</tr>
<tr>
<td>Alison</td>
<td>Murray</td>
<td>DRI</td>
<td>USA</td>
<td><a href="mailto:Alison.Murray@dri.edu">Alison.Murray@dri.edu</a></td>
</tr>
<tr>
<td>Annick</td>
<td>Wilmotte</td>
<td>U. Liège</td>
<td>BEL</td>
<td><a href="mailto:awilmotte@ulg.ac.be">awilmotte@ulg.ac.be</a></td>
</tr>
<tr>
<td>Craig</td>
<td>Cary</td>
<td>U. Waikato</td>
<td>NZ</td>
<td><a href="mailto:caryc@waikato.ac.nz">caryc@waikato.ac.nz</a></td>
</tr>
<tr>
<td>Guido</td>
<td>di Prisco</td>
<td>U. Naples</td>
<td>IT</td>
<td><a href="mailto:guidodi@ibbr.cnr.it">guidodi@ibbr.cnr.it</a></td>
</tr>
<tr>
<td>Claudio</td>
<td>Gonzales-Wevar</td>
<td>U. Chili</td>
<td>CHI</td>
<td><a href="mailto:omeuno01@hotmail.com">omeuno01@hotmail.com</a></td>
</tr>
<tr>
<td>Dom</td>
<td>Hodgson</td>
<td>BAS</td>
<td>UK</td>
<td><a href="mailto:dahoho@bas.ac.uk">dahoho@bas.ac.uk</a></td>
</tr>
<tr>
<td>Anton</td>
<td>van de Putte</td>
<td>RBINS</td>
<td>BEL</td>
<td><a href="mailto:antonarctica@gmail.com">antonarctica@gmail.com</a></td>
</tr>
<tr>
<td>Stefano</td>
<td>Schiaparelli</td>
<td>U. Genoa</td>
<td>IT</td>
<td><a href="mailto:Stefano.Schiaparelli@unige.it">Stefano.Schiaparelli@unige.it</a></td>
</tr>
<tr>
<td>Mary-Ann</td>
<td>Lea</td>
<td>IMAS, U Tas</td>
<td>AUS</td>
<td><a href="mailto:MaryAnne.Lea@utas.edu.au">MaryAnne.Lea@utas.edu.au</a></td>
</tr>
<tr>
<td>Conxita</td>
<td>Avila</td>
<td>U. Barcelona</td>
<td>ESP</td>
<td><a href="mailto:conxita.avila@ub.edu">conxita.avila@ub.edu</a></td>
</tr>
<tr>
<td>Andres</td>
<td>Barbosa Alcon</td>
<td>MNCN</td>
<td>ESP</td>
<td><a href="mailto:barbosa@mnecn.csic.es">barbosa@mnecn.csic.es</a></td>
</tr>
<tr>
<td>Lucas</td>
<td>Ruberto</td>
<td>Instituto de</td>
<td>ARG</td>
<td><a href="mailto:luruberto@gmail.com">luruberto@gmail.com</a></td>
</tr>
<tr>
<td>Satoshi</td>
<td>Imura</td>
<td>NiPR</td>
<td>JPN</td>
<td><a href="mailto:imura@nipr.ac.jp">imura@nipr.ac.jp</a></td>
</tr>
<tr>
<td>Julian</td>
<td>Gutt</td>
<td>A. W. Inst.</td>
<td>DE</td>
<td><a href="mailto:julian.gutt@awi.de">julian.gutt@awi.de</a></td>
</tr>
</tbody>
</table>
Requests to the Secretariat:
*If there are specific administrative tasks you would like help with such as your webpages, mailing list, online meeting tools, etc., please include them below:*

We appreciate the support from the Secretariat that we currently receive for finance, mailing list and website matters. If SCAR is considering producing more education and outreach materials or tools then we would love to be involved.

### Appendix 1. AntEco Publications 2016-17:

- Bokhorst, Stef, Convey, Peter, Huiskes, Ad, Aerts, Rien. (2016) Usnea antarctica, an important Antarctic lichen, is vulnerable to aspects of regional environmental change. Polar Biology, 39. 511-521. 10.1007/s00300-015-1803-z


Coetzee, Bernard W.T., Convey, Peter, Chown, Steven L.. (2016) Expanding the protected area network in Antarctica is urgent and readily achievable. Conservation Letters. 10.1111/conl.12342


De Pooter, Daphn; Appeltans, Ward; Bailly, Nicolas; Bristol, Sky; Deneudt, Klaas; Eliezer, Menashè; Fujioka, Ei; Giorgetti, Alessandra; Goldstein, Philip; Lewis, Mirtha; Toward a new data standard for combined marine biological and environmental datasets-expanding OBIS beyond species occurrencesBiodiversity Data Journal 5 2017 Pensoft Publishers


Hodson, Andy, Nowak, A , Sabacka, Marie, Jungblut, Ann, Navarro, Francisco, Pearce, David, Convey, Peter, Vieira, Goncalo. (2017) Climatically sensitive transfer of iron to maritime Antarctic ecosystems by surface runoff. Nature Geoscience, 8. 7 pp. 10.1038/ncomms14499


Cyanobacterium Isolated from Lake Bruehwiler (Larsemann Hills, Antarctica).

Genome Announcements, 01546-16.


Majewska, Roksana, Convey, Peter, De Stefano, Mario. (2016) Summer epiphytic diatom communities from Terra Nova Bay and Cape Evans (Ross Sea, Antarctica) – A synthesis and final conclusions. PLoS One, 11. 30 pp. 10.1371/journal.pone.0153254


Moles J, Wägele H, Ballesteros M, Pujals Á, Uhl G, Avila C (2016b) The end of the cold loneliness: 3D reconstruction of Doto antarctica (Heterobranchia: Nudibranchia) and description of the sympatric D. carinova n. sp. PLOS ONE 7: e0157941


See Too, Wah-Seng, Tan, Jia Yi, Ee, Robson, Lim, Yan-Lue, Convey, Peter, Pearce, David, Yin, Wai-Fong, Chan, Kok Gan. (2016) De novo assembly of complete genome sequence of Planococcus kocurii ATCC 43650T, a

See-Too, Wah Seng, Lim, Yan-Lue, Ee, Robson, Convey, Peter, Pearce, David A., Yin, Wai-Fong, Chan, Kok Gan. (2016) Complete genome of Pseudomonas sp. strain L10.10, a psychrotolerant biofertilizer that could promote plant growth. Journal of Biotechnology, 222. 84-85. 10.1016/j.jbiotec.2016.02.017

See-Too, Wah Seng, Salazar, Sergio, Ee, Robson, Convey, Peter, Chan, Kok-Gan, Peix, Alvaro. (2017) Pseudomonas versuta sp. nov., isolated from Antarctic soil. Systematic and Applied Microbiology. 10.1016/j.syapm.2017.03.002

See-Too, Wah-Seng, Chua, Kah-Ooi, Lim, Yan-Lue, Chen, Jian-Woon, Convey, Peter, Begam Mohd Mohidin, Taznim, Yin, Wai-Fong, Chan, Kok-Gan. (2017) Complete genome sequence of Planococcus donghaensis JH1T, a pectin-degrading bacterium. Journal of Biotechnology. 10.1016/j.jbiotec.2017.05.005


Teschke, K; Beaver, D; Bester, MN; Bombosch, A; Bornemann, H; Brandt, A; Brtnik, P; De Broyer, C; Burkhardt, E; Danis, B; Scientific background document in support of the development of a CCAMLR MPA in the Weddell Sea (Antarctica)–Version 2016-Part A: General context of the establishment of MPAs and background information on the Weddell Sea MPA planning area 2016


Appendix 2. AntEco External Science Funding 2016-17:

2016: South African National Research Foundation SANAP program: R450,000 (Cowan)
2017: South African National Research Foundation SANAP program: R380,000 (Cowan)
BELSPO project CCAMBIO (Climatic change and Antarctic microbial diversity) (www.ccambio.ulg.ac.be) for research
BELSPO project MICROBIAN for research
FNRS FRIA PhD fellowship to Igor S. Pessi for research
Belgian Coordinated Collections of Microorganisms funding the BCCM/ULC public collection of cyanobacteria, that is focussing on Antarctic cyanobacterial strains (http://bccm.belspo.be/about-us/bccm-ulc).
2017-2019: Co-Investigator of the project “Enzymes of a cold-active metabolic pathway for the biosynthesis of long-chain omega-3 fatty acids:
biotechnological applications”. Italian National Programme for Antarctic Research (PNRA). Total Funding: EURO 94,500.00

2017-2019: Co-Investigator of the project “Journey to the cold and back: comparative genomics and transcriptomics in Antarctic and sub-Antarctic notothenioids”. Italian National Programme for Antarctic Research (PNRA). Total Funding: EURO 138,500.00

Belspo AntaBIS building a Virtual lab for the Antarctic and the Souther ocean, part of EU-lifewatch

Methanogenic biodiversity and activity in Arctic and Sub-Antarctic ecosystems affected by climate change. (Sub-award) ERANET-LAC. Total award amount $598,734. Total award period 9/1/15 – 8/31/18. (AE Murray)

Importance of heterotrophic and phototrophic N2 fixation in the McMurdo Dry Valleys on local, regional and landscape scales- NSF/Opp ($467,728, 6/1/013-5/31/17). (SC Cary)


New Zealand Terrestrial Antarctic Biocomplexity Survey sequencing project. Joint Genome Community Sequencing Program. Joint Genome Institute, Walnut Creek, USA ($190,000 in kind) (SC Cary)

Development of an International Genetic Repository for Antarctica. Antarctica New Zealand. ($100,000, 2013-2017) (SC Cary)

Evidenced-based Risk Assessment of the McMurdo Dry Valley Ecosystem. (MBIE, $2.5M , 2014-2018) (SC Cary)

A multidisciplinary approach to understanding the vulnerability of Antarctica’s physical and eco-systems to changing global climate. International Relationships Fund. MBIE ($450,000/3 years). (SC Cary)

Resilience in Antarctic biota and ecosystems. NZARI Type B proposal. ($1.1M, 2016-2019) (SC Cary)

2017-2019: PI of the project “TNB-CODE” - Terra Nova Bay barCODing and mEtabarcoding of Antarctic organisms from marine and limno-terrestrial environments”. Italian National Research Antarctic Program (PNRA). Total Funding: EURO 104000