Academic Consortium for the 21st Century (AC21)
Special Project Fund

Workshop to Develop a Collaborative Research Network and Agenda for Antarctic Tourism

FINAL PROJECT REPORT

October 2022

Project Leadership
Dr. Yu-Fai Leung, PI
North Carolina State University, USA

Dr. Daniela Cajiao, Project coordinator
North Carolina State University, USA

AC21 Partners
Dr. Daniela Liggett, co-PI
University of Canterbury, New Zealand

Dr. Chengzhao Wu, co-PI
Tongji University, China

Non-AC21 Collaborators
Dr. Javier Benayas, Universidad Autónoma de Madrid, Spain
Dr. Pablo Tejedo, Universidad Autónoma de Madrid, Spain
Dr. Kees Bastmeijer, University of Groningen, the Netherlands
Dr. Karen Alexander, Heriot Watt University, United Kingdom
Dr. Hanne Nielsen, University of Tasmania, Australia
Dr. Gabriela Roldan, Antarctic Heritage Trust, New Zealand
Dr. Gunter Reck, Universidad San Francisco Quito, Ecuador
I. Abstract

With the support of the AC21 Special Project Fund, this project formed a core research team with eleven researchers from eight academic institutions (including three AC21 Partners) in eight countries to examine the state of research on Antarctica tourism and key research needs. Through this project, we have contributed to the formation of the Antarctic Tourism Action Group (Ant-TAG) under the Scientific Committee on Antarctic Research (SCAR), a new platform to foster further collaboration beyond the AC21 project period. We have also facilitated multiple short-term collaborations that resulted in conference presentations, peer-reviewed publications, and grant proposals. Using online meetings and hybrid workshops, we were able to engage a wider community of Antarctic and protected area researchers and professionals in a Horizon Scan process to identify Antarctic tourism research needs and their priorities for the next 3-5 years.

II. Introduction

Antarctica, the last frontier on earth, is witnessing drastic changes in recent decades due to a variety of global and regional forces such as climate change, fisheries, introduced species, and tourism. The Antarctic Peninsula, for example, is one of the fastest warming regions in the world. Yet, this region accommodates the vast majority of Antarctic tourism operations and activities, which has been steadily increasing and quickly diversifying in terms of tour itineraries and characteristics.

There has been a modest level of research attention devoted to Antarctic tourism, including ecological effects, tourist experiences, sustainable management, and governance and policies. However, this body of research is highly fragmented (Stewart et al., 2017). There remains wide knowledge gaps on many fronts of Antarctic tourism as research efforts are not commensurate with the pace of changes. Filling these key knowledge gaps will inform sustainable management of Antarctic tourism to maximize its positive impacts while minimizing the negative ones. This is a significant undertaking that will only be possible with a strong and sustained network of active researchers collaborating on prioritized research needs.

The AC21 Special Project Fund provides a unique and timely opportunity for convening scholars from AC21 partner institutions with complementary expertise to examine the state of research on Antarctica tourism and key research priorities. The overall goal of this project was to build a community of researchers who collaborate to tackle high-priority knowledge gaps that inform sustainable management of Antarctic tourism. Specific objectives were:

A) To build a collaborative research network on Antarctic tourism;
B) To facilitate short-term collaborations, and
C) To develop a proposed research agenda with community participation through a workshop and online exchange.
Due to the unprecedented disruptions of COVID-19 pandemic, many planned activities supportive of project objectives were delayed between 2020 and 2021. Two project extensions were requested and approved with the current end date of September 30, 2022. With the extended timeline, the project team were able to perform all project activities and accomplish the project objectives, as summarized in the following sections.

III. Project Activities

During the project period, including its extensions, a total of 12 virtual meetings were held with the project team members. At the initial meetings, potential members for the collaborative research network on Antarctic tourism (CRNAT) were identified and invited to join this initiative, resulting in an 11-member CRNAT core team. At subsequent meetings, the core team identified, aligned, and prioritized research interests and needs through different conceptual exercises. Members of the CRNAT also presented their initiatives on different research topics and interests which resulted in short-term collaborations with specific outputs. At least three virtual meetings were conducted to get specific input from the members, especially for organizing the methods and workshops for developing the Horizon Scan surveys. At the final meetings, the core team met to discuss the Horizon Scan methodology and survey results.

A. Build a collaborative research network

<table>
<thead>
<tr>
<th>Topic</th>
<th>Activities</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visibility of the project</td>
<td>Once the project was approved, an online profile was created on ResearchGate to facilitate information regarding the aims of the project and the contacts of the members.</td>
<td>ResearchGate project profile: <a href="https://www.researchgate.net/project/AC21-Antarctic-Tourism-Research-Project">https://www.researchgate.net/project/AC21-Antarctic-Tourism-Research-Project</a></td>
</tr>
<tr>
<td>Adding collaborators to the project</td>
<td>Soon after the inception of the project (with four members), we established contact with other researchers interested and invited them to join the core team.</td>
<td>The project counted a total of 11 core team members representing eight universities from eight countries.</td>
</tr>
<tr>
<td>Communicating and reporting progress</td>
<td>During the project, oral presentations at two international conferences were made for communicating and presenting the progress of the project to the Antarctic research community.</td>
<td>Presentation at the SCAR SC-HASS Conference. Kobe, Japan, November 2021 (virtual) -- <em>Academic Consortium 21 (AC21) A Collaborative Approach to Developing a Research Agenda for Antarctic Tourism.</em> Presentation and the 10th SCAR Open Science Conference.</td>
</tr>
</tbody>
</table>
Collaborative network beyond this AC21 project

To foster further collaborations and engage a larger community, four project collaborators in this project team developed a proposal to form the Antarctic Tourism Action Group (Ant-TAG) under the Scientific Committee on Antarctic Research (SCAR). This proposal was endorsed by SCAR’s Standing Committee on Humanities and Social Sciences (SC-HASS) and approved by SCAR in 2021. This new action group was introduced to the 44th Antarctic Treaty Consultative Meeting (ATCM) in Berlin, Germany in May 2022.

Contributed to the formation of the Antarctic Tourism Action Group (Ant-TAG). All of the four co-leads of the Ant-TAG are collaborators of this AC21 project.

AC21 Panel session

Held at the virtual SCAR SC-HASS Biennial Conference in November 2021. The purpose was to present the progress and future activities of the project. Five presentations were developed, and a plan for the Horizon Scan process was presented.

Hybrid panel session of the project.

B. Facilitate short-term collaborations

<table>
<thead>
<tr>
<th>Topic</th>
<th>Activities</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Chinese tourism in the Antarctic</td>
<td>As part of the short-term collaborations, a pilot survey of Antarctic Chinese tourists was conducted to better understand their perceptions, preferences and experiences. A manuscript on international regulations of Antarctic tourism was developed.</td>
<td>Manuscript reporting the survey results in preparation for submission. A peer-reviewed article was published: Wu, C. et al. In Press. The international agreement on the development and management of global Antarctic tourism (in Chinese). <em>Ocean Development and Management</em>. This paper was presented to the Chinese Polar Program. Presentation at the SC-HASS Biennial Conference. Kobe, Japan, November 2021 (virtual).</td>
</tr>
<tr>
<td>The status of knowledge and practice of</td>
<td>An appraisal of the different management instruments and concepts applied to Antarctic</td>
<td>A peer-reviewed article was published: Cajiao et al., 2021. Adaptive management of sustainable tourism in</td>
</tr>
</tbody>
</table>
The state of research on environmental impacts of Antarctic tourism

A review of the environmental tourism impacts in Antarctica was completed during the project period. This involved the collaboration of five members of the CRNAT. Results were published in a peer-reviewed journal and presented at two international meetings.

A peer-reviewed article was published: Tejedo et al., 2022. What are the real environmental impacts of Antarctic tourism? Unveiling their importance through a comprehensive meta-analysis. *Journal of Environmental Management, 308*, Art. 114634. [https://doi.org/10.1016/j.jenvman.2022.114634](https://doi.org/10.1016/j.jenvman.2022.114634)

Presentation at the SCAR SC-HASS Biennial Conference. Kobe, Japan, 2021 (virtual).

Presentation and the 10th SCAR Open Science Conference. India, August 2022 (virtual).

C. Develop a proposed research agenda through community participation

<table>
<thead>
<tr>
<th>Topic</th>
<th>Activities</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify research needs and gaps for Antarctic tourism</td>
<td>For identifying the different research needs and gaps regarding Antarctic Tourism a community exercise was conducted. For this, subgroups were organized according to shared interests. The Concept Board online tool was used for gathering and organizing the different ideas. In the end, three different concept boards were produced, and one compromised version was created. This concept board was the base for organizing the Horizon Scan exercise.</td>
<td>Handout with a preliminary prioritization of research needs and interests. Four concept boards outputs contain the different perspectives and research needs among researchers</td>
</tr>
<tr>
<td>Horizon Scan of Antarctic Tourism</td>
<td>After deliberation with the members, a methodology for the Horizon Scan was determined. It includes two stages of community participation.</td>
<td>Hybrid workshop held in Potsdam, Germany, May 2022. Two Horizon Scan surveys completed with</td>
</tr>
</tbody>
</table>
The first stage consisted of a Qualtrics survey to identify tourism research questions among a broader spectrum of participants involved in nature tourism, protected areas, and polar tourism. Results of the first survey were reviewed and consolidated using a hybrid workshop held in Potsdam, Germany, May 2022. This event counted a total of 15 participants.

At the second stage, another Qualtrics survey on the prioritization of research topics and questions was launched. A total of 82 responses were collected. Data analyses are complete with manuscript being developed. Results will allow the development of two peer-reviewed manuscripts.

Additionally, one management document is expected to be presented at the 45th Antarctic Treaty Consultative Meeting (ATCM) in Helsinki, Finland, June 2023. An abstract for an oral presentation will be submitted for the SC-HASS Biennial conference, Portugal 2023.

two survey databases compiled. Results have been analyzed and are being disseminated in forms of journal manuscripts, an ATCM management document, and conference presentations.

IV. Achievements and Outcomes

This project has provided an excellent opportunity to engage interested researchers and practitioners in a variety of project activities through different channels, including online collaborative tools (e.g., Concept Boards, MURAL), virtual meetings, hybrid workshops, and community surveys. Building upon the three AC21 institutions, NC State, Canterbury, and Tongji, the project brought together a core team, some of whom had not collaborated prior to the project. Through this project experience, our core team fully expects to continue and expand their collaboration well beyond the project completion, through the Ant-TAG and other platforms. For example, building on the spirit of collaboration through this project, our team members were engaged in grant proposal development for the Spanish and Dutch Antarctic research programs. Three Dutch proposals were approved for funding in July 2022.

Another major achievement of this project is a research agenda for Antarctic tourism through a participatory process, involving both the core project team and a broader community with expertise on tourism research in Antarctica and other protected areas. Through the two-stage Horizon Scan process, we were able to identify the top-priority research topics and questions for Antarctic tourism in the next 3-5 years. While some research topics have been advocated by individual researcher, through this project, the urgency of these topics/questions was validated by the Horizon Scan results. We believe that this research agenda will catalyze the discourse on
Antarctic tourism, stimulate collaborative research in the near future, and inform priorities of funding support from the industry, scientific organizations (e.g., SCAR, SC-HASS), National Antarctic Programs, and the ATCM at large.

Our AC21 project has also received a number of recognitions. These include mentions of this project in an Information Paper (IP 75) submitted to 44th Antarctic Treaty Consultative Meeting (ATCM) in Berlin, Germany. Our team member Dr. Chengzhao Wu was also invited to present this project and the associated studies at the Chinese Arctic and Antarctic Administration’s Headquarters in Shanghai, China.

V. Conclusion

In conclusion, the project team is most grateful for the financial support from the Academic Consortium 21 and their gracious extensions of project timelines. We have achieved our project objectives and made significant advancements toward the ultimate goal. We have contributed: 1) to research on Antarctic tourism through our presentations and publications, 2) to the Antarctic tourism community by offering a proposed research agenda for the next 3-5 years, and 3) to AC21’s vision of promoting of cooperation in education and research between members, the bridging between different societies in the world and the delivering of wisdom to all people to mutually understand and share values, knowledge and cultures necessary to improve quality of life and to foster co-existence beyond national and regional boundaries in the 21st century. We believe that polar issues will continue to evolve and research collaborations are much needed to inform policy and management decisions for these global commons. We hope that AC21 will continue to support funding proposals on Antarctic or polar topics which will likely lead to fruitful outcomes.

VI. Achievements made within SPF collaboration

Several of the AC21 partners and non-AC21 collaborators of this project collaborated in a number of grant proposals, three of which were approved by the Dutch Research Council for funding in July 2022. These proposals are entitled: 1) Antarctic tourism - developing knowledge and tools to minimize cumulative impacts on biodiversity and wilderness values in Antarctica, 2) Fostering environmental stewardship among Antarctic tourism governance actors and institutions, and 3) Growing understanding of individual drivers of expectations and behaviours to enhance sustainable tourism in the Antarctic.

Two peer-reviewed journal articles have resulted from the short-term collaborations:


Several more manuscripts, including the one reporting the Antarctic tourism research agenda, are being prepared for submission.

VII. Budget Summary

Submitted as a separate document.
VIII. Appendices (including Photos and Links)

A. Project team members

Dr. Yu-Fai Leung          Dr. Daniela Liggett          Dr. Chengzhao Wu          Dr. Daniela Cajiao

Dr. Javier Benayas        Dr. Pablo Tejedo             Dr. Kees Bastmeijer       Dr. Karen Alexander

Dr. Hanne Nielsen         Dr. Gabriela Roldan        Dr. Gunther Reck
B. AC21 Antarctic Tourism Research Project Webpage on Research Gate
[https://www.researchgate.net/project/AC21-Antarctic-Tourism-Research-Project]
C. Publication’s screenshots


D. Organized sessions and presentations at conferences


Agenda

A Collaborative Approach to Developing a Research Agenda for Antarctic Tourism (PANEL by the AC21 Project)

18 November 2021
17:30-19:00 Kobe/Tokyo Time
03:30-05:00 Quito | 03:30-05:00 Raleigh (US-EST) | 09:30-11:00 Madrid/Amsterdam (CEI) | 16:30-18:00 Beijing | 19:30-21:00 Hobart (AET) | 21:30-23:00 Christchurch Time

<table>
<thead>
<tr>
<th>Time Allocated</th>
<th>Agenda Item</th>
<th>Lead Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>Welcome; Introduction to session and the AC21 Project</td>
<td>Yu-Fai Leung</td>
</tr>
<tr>
<td>10 minutes</td>
<td>A research agenda for Antarctic tourism: Why? Why now?</td>
<td>Daniela Liggett, Kees Bastmeijer</td>
</tr>
<tr>
<td>15 minutes</td>
<td>Short-term collaboration highlights</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Towards adaptive tourism management in Antarctica: Where are we now? (5 min.)</td>
<td>Daniela Cajiao</td>
</tr>
<tr>
<td></td>
<td>b. Environmental impacts of tourism on Antarctica: The state of research (5 min.)</td>
<td>Pablo Tejedo</td>
</tr>
<tr>
<td></td>
<td>c. Emerging tourism markets and the China example (5 min.)</td>
<td>Chengzhao Wu, Yu-Fai Leung</td>
</tr>
<tr>
<td>10 minutes</td>
<td>Vision for a collaborative future: SC-HASS Tourism Action Group proposal</td>
<td>Hanne Nielsen, Gabriela Roldan, Daniela Cajiao</td>
</tr>
<tr>
<td>5 minutes</td>
<td>Q&amp;A’s</td>
<td>Yu-Fai Leung (moderator)</td>
</tr>
<tr>
<td>10 minutes</td>
<td>Developing an Antarctic tourism research agenda: A two-step horizon scanning (HS) approach</td>
<td>Yu-Fai Leung</td>
</tr>
<tr>
<td>25 minutes</td>
<td>Community activity (structured group discussion)</td>
<td>Yu-Fai Leung and Daniela Cajiao (moderators)</td>
</tr>
<tr>
<td>10 minutes</td>
<td>General feedback</td>
<td>Yu-Fai Leung (moderator)</td>
</tr>
</tbody>
</table>

1 The AC21 project team: Dr. Yu-Fai Leung (North Carolina State U., USA; project PI), Dr. Daniela Liggett (U. of Canterbury, New Zealand), and Dr. Chengzhao Wu (Tongji U., China). They are joined by eight other members: Dr. Keren Alexander (U. of Tasmania, Australia), Dr. Kees Bastmeijer (Tilburg U., the Netherlands), Dr. Javier Bonayas (U. Autónoma de Madrid, Spain), Ms. Daniela Cajiao (U. Autónoma de Madrid, Spain), Dr. Hanne Nielsen (U. of Tasmania, Australia), Dr. Gabriela Roldan (U. of Canterbury, New Zealand), Dr. Gunter Neck (U. San Francisco de Quito, Ecuador), and Dr. Pablo Tejedo (U. Autónoma de Madrid, Spain).
Introduction to the SC-HASS Panel Session

A Collaborative Approach to Developing a Research Agenda for Antarctic Tourism:
Introduction to the SC-HASS Panel Session

Yu-Fai Leung
Professor and Director of Graduate Programs
North Carolina State University, USA
18 November 2021

Why do we need a research agenda for Antarctic tourism?

Context setting: Why do we need a research agenda for Antarctic tourism?

Daniela Liggett and Kees Bastmeijer
University of Canterbury (NZ) and Tilburg University (NL)
Adaptive management of Sustainable Tourism in Antarctica.

Adaptive Management of Sustainable Tourism in Antarctica:
A RHETORIC OR WORKING PROGRESS?

Daniela Caijao, Javier Benayas, Pablo Tejedo & Yu-Fai Leung
Kobe, November 18th, 2021

Environmental impacts of Antarctic tourism

Environmental impacts of Antarctic tourism:
The state of research
A Collaborative Approach to Developing a Research Agenda for Antarctic Tourism
18 November 2021
Antarctic tourist visitation trends, emerging markets, and the China example

Antarctic Tourist Visitation Trends, Emerging Markets, and the China Example

Chengzhao Wu¹ and Yu-Fai Leung²
¹ Tongji University, China
² North Carolina State University, USA
18 November 2021

SCAR Tourism Action Group (ANT-TAG)

Hanne Nielsen
University of Tasmania (Australia)

Daniela Cajiao
Universidad Autónoma de Madrid (Spain), Universidad de San Francisco de Quito (Ecuador)

Gabriela Roldán
University of Canterbury (New Zealand)

Yu-Fai Leung
North Carolina State University (USA)
18 November 2021
Developing an Antarctic tourism research agenda –
A two-stage horizon scanning (HS) approach

Project PI: Yu-Fai Leung
Project Co-Investigators: Daniela Liggett, Chengzhao Wu
Project Team: Karen Alexander, Kees Bastmeijer, Javier Benayas, Daniela Caijao,
Hanne Nielsen, Gabriela Roldan, Gunter Reck, Pablo Tejedo

Adaptive Management of Sustainable Tourism in Antarctica. A rhetoric of working progress?

The Antarctic Tourism “Anthropause”: What’s next?
Unveiling the real and potential environmental impacts of Antarctic tourism through a comprehensive meta-analysis of the published research

10th SCAR Open Science Conference—4 August 2022

Agenda

### Academic Consortium 21 (AC21) Project Meeting*

* A Collaborative Approach to Developing a Research Agenda for Antarctic Tourism

**Sunday, 29 May 2022, 10:00-16:00 Central European Time**

**JOIN IN PERSON:** Raum 4-24a, Volmer, Wissenschaftsetage, Am Kanal 47, 14467 Potsdam, Germany

**JOIN ONLINE VIA ZOOM --** [https://ncsu.zoom.us/j/9678355955](https://ncsu.zoom.us/j/9678355955)

**Meeting Co-hosts:**
Dr. Yu-Fai Leung (Project PI), North Carolina State University, U.S.A., [leung@ncsu.edu](mailto:leung@ncsu.edu)
Dr. Daniela Liggett (Project co-PI), University of Canterbury, New Zealand, [daniela.liggett@canterbury.ac.nz](mailto:daniela.liggett@canterbury.ac.nz)

**FINAL MEETING AGENDA**

<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda Item</th>
<th>Presenter(s)/ Moderator(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00-10:15</td>
<td>A. Welcome, Introductions, AC21 Project Overview</td>
<td>Daniela Liggett &amp; Yu-Fai Leung</td>
</tr>
<tr>
<td>10:15-11:45</td>
<td>B. Developing a Research Agenda for Antarctic Tourism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Research needs conceptual models from the AC21 core team</td>
<td>Yu-Fai Leung, Pablo Tejedo &amp; Daniela Cajiao</td>
</tr>
<tr>
<td></td>
<td>2. Community input: Highlights of Mural exercise; AC21 Horizon Scan 1st survey preliminary results</td>
<td>Daniela Cajiao &amp; Yu-Fai Leung</td>
</tr>
<tr>
<td></td>
<td>3. Next steps and final outputs</td>
<td>Yu-Fai Leung, Daniela Liggett &amp; Chengzhao Wu (moderators)</td>
</tr>
<tr>
<td></td>
<td>o Synthesis/prioritization of research needs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o SCAR Open Science Conference</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Project outputs and collaborative opportunities</td>
<td></td>
</tr>
<tr>
<td>11:45-13:00</td>
<td>C. Collaborative Fronts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Spanish and Dutch research proposals; Overview and collaborative opportunities</td>
<td>Kees Bastmeijer, Javier Benayas &amp; Machiel Lamers</td>
</tr>
<tr>
<td></td>
<td>2. The SCAR Tourism Action Group (Ant-TAG): Overview and collaboration opportunities</td>
<td>Hanne Nielsen, Gabriela Roldan, Daniela Cajiao &amp; Yu-Fai Leung</td>
</tr>
<tr>
<td></td>
<td>3. Other collaborative fronts, including writing project updates</td>
<td>Yu-Fai Leung &amp; Daniela Liggett (moderators)</td>
</tr>
<tr>
<td>13:00-14:30</td>
<td>Lunch at a nearby restaurant [at your own cost]</td>
<td></td>
</tr>
<tr>
<td>14:30-15:50</td>
<td>Walking Tour in Potsdam; Informal Networking</td>
<td>Daniela Liggett leads</td>
</tr>
<tr>
<td>15:50-16:00</td>
<td>Meeting Concludes</td>
<td>Yu-Fai Leung &amp; Daniela Liggett</td>
</tr>
</tbody>
</table>

* Project Overview: [https://www.researchgate.net/project/AC21-Antarctic-Tourism-Research-Project](https://www.researchgate.net/project/AC21-Antarctic-Tourism-Research-Project)
Potsdam Workshop photo

E. Team’s Zoom meetings and initial conceptual outputs from the Horizon Scan exercise