GATEWAY ANTARCTICA 25 YEARS

UC UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Access Antarctica

ISSUE 47
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Gateway Antarctica, Centre for Antarctic Studies and Research

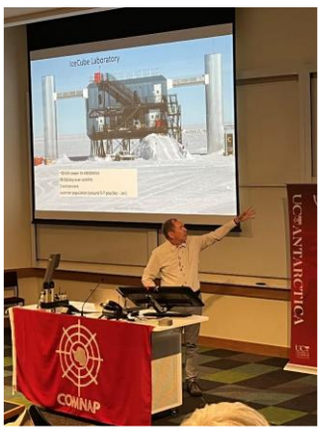
Antarctic Summer Science Lecture Series

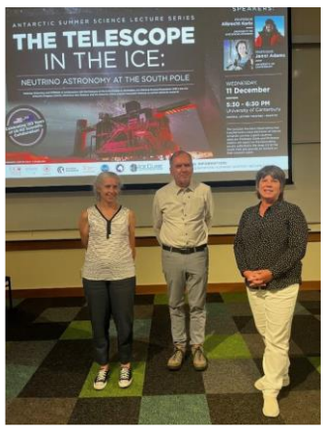
Gateway Antarctica & COMNAP host Distinguished Academics from the US Antarctic Program

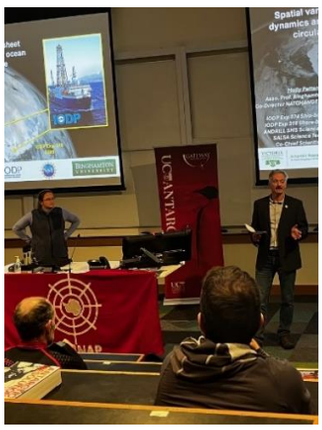
Gateway Antarctica and The Council of Managers of National Antarctic Programs (COMNAP) collaborated together with Vela Science (Chris Martin) to host principal investigators from the US Antarctic Program, inviting them to be part of the public "Antarctic Summer Science Lecture Series 2024".

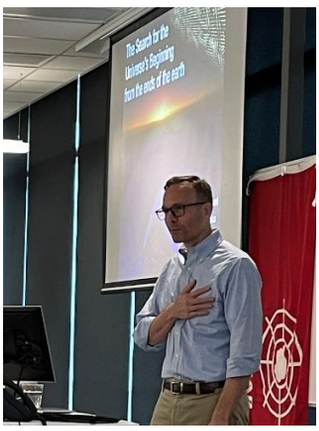
The series of three public presentations provided a snapshot of the important research taking place in Antarctica and how Christchurch and the University of Canterbury play a key role in enabling that research as an "Antarctic gateway". Presentation 1 was delivered by Professor John Kovac of the Astronomy Department of Harvard University. John has been working in the Antarctic for decades and presented his groups' critical work on understanding our universe, through the international "BICEP" project that John leads. The BICEP3 telescope is located at the US Amundsen-Scott South Pole Station. Associate Professor Molly Patterson from the Department of Earth Sciences of Binghamton University, was our second presenter in the series. Molly presented her research on the ice sheet dynamics and its influence on deep ocean circulation-research that is delivering data to help us understand how the Antarctic is a driver and responder to change that will impact all of us. And finally, our own Professor Jenni Adams joined her US research collaborator, Professor Albrecht Karle, from the University of Madison-Wisconsin, to tell the fascinating story of the ICECUBE neutrino project at the South Pole. ICECUBE is an international consortium that has discovered the first-ever confirmation of a neutrino from a cosmic origin. Jenni and Albrecht are part of a multinational collaboration. The ICECUBE telescope sensors are buried in 2kms of ice at the South Pole. Work is being undertaken to upgrade and expand the sensor array this summer season.

COMNAP, Vela Science, and Gateway Antarctica will continue to work with the US National Science Foundation, with the US Embassy, ChristchurchNZ and Antarctica New Zealand to invite distinguished Antarctic researchers to stop over to/from Antarctica and hope that the summer science lecture series 2025 is as popular and interesting as this year's series.









Director's Report

It is a pleasure to continue *Access Antarctica*, the newsletter of UC's Antarctic network.

This year we celebrate a remarkable milestone: in May 2000, Gateway Antarctica was officially opened, and we therefore added '25 years' to our logo. A variety of activities is planned throughout the year providing opportunities to look back and, more importantly, into the future. Many of our alumni are still connected to Antarctica, and we will ask some of them to tell their story. We also report on the past field season, which gives a taste that UC is buzzing with Antarctic research, all requiring significant preparation and support by so many. Thanks to all staff, including technicians and administrators, who work efficiently and effectively to make field work safe and successful. Back here in Aotearoa, Gateway Antarctica contributed to the activities around the Antarctic season opening, and we co-launched the public Antarctic summer lecture series with US scientists travelling through Christchurch-both outstanding activities. Our first-year summer course, ANTA101, was again a success. PCAS, our postgraduate flag-ship course, has now been shifted to semester 2- see the last page for further information. **Please spread the word!**

Like 25 years ago, the newsletter's initial title points to the direct access to Antarctica through our Gateway city, but we are increasingly aware of our carbon footprint. Let's keep in mind that access today is also achieved by satellites and computer models, but these technologies rely critically on reference and ground data, and some research simply can't do without field work. We therefore keep the name. If we have missed something in this newsletter, please let us know for inclusion next time or in the Annual Review. Enjoy the reading! In the next issue, we report on our upcoming involvement in phase 2 of the Antarctic science platform and our recently accepted role to co-host the platform here at UC.

Professor Wolfgang Rack

COMNAP Secretariat Update

(Council of Managers of National Antarctic Programs)

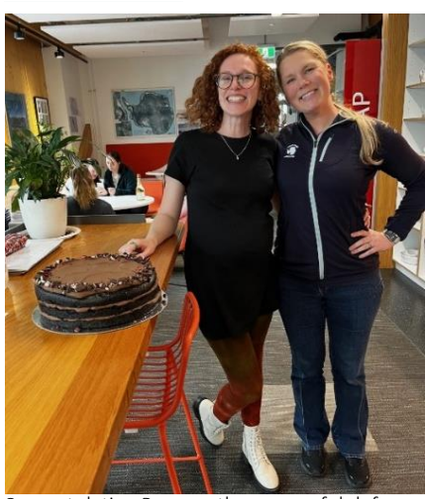
In the last quarter of 2024, COMNAP was a hive of activity. We welcomed the Scientific Committee of Antarctic Research (SCAR) President Professor Gary Wilson (New Zealand) to the COMNAP Secretariat and together advanced plans for a joint meeting of the COMNAP and SCAR Executive Committees in 2025. Dr Andrea Colombo (COMNAP) was part of the UC Delegation to COP29. This was an excellent opportunity to see how the Conference of the Parties (COP) works in action and also supported the COMNAP goal to highlight the role of Antarctica in driving and responding to climate change. Andrea spent two weeks working at odd hours of the day in order to participate online during the COP sessions in Baku, Azerbaijan. The COMNAP Secretariat along with Gateway Antarctica were co-organizers working in partnership with COMNAP Member, US National Science Foundation (US NSF) on the Antarctic Summer Science Lecture Series 2024 (see page 1). We are already looking forward to the series planned for late 2025.

The COMNAP Secretariat started off 2025 with visitors from two COMNAP Member national Antarctic programs, the US NSF's Office of Polar Programs (OPP) and from the Korea Polar Research Institute (KOPRI). Col. Paul Sheppard (NSF and former COMNAP Air Operations Expert Group Leader) was in Christchurch as the co-ordinator for the NSF Science Board delegation that was on its way to Antarctica. Also in the delegation was the NSF OPP Interim Director Dr Jean Cottam Allen. Soon thereafter, we said goodbye to Dr Yongcheol Park (KOPRI) who has been the Head of the KOPRI Offices in Christchurch for the past two years. Yongcheol returns to KOPRI offices in Incheon taking up his role as Principal Research Scientist in the Division of Polar Earth-System Sciences. We welcomed his replacement, Dr Daeyeong Kim (KOPRI), a structural geologist, into the role of Head of the KOPRI Offices in Christchurch for the next 12 months.

www.comnap.aq

Success

Gateway Antarctica's newest PhD alumni Dr Rose Foster-Dyer

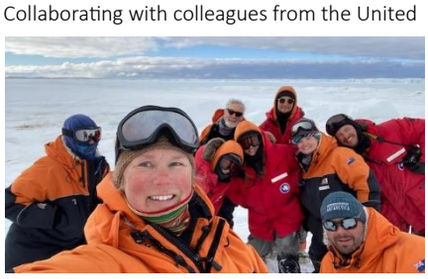


Congratulating Rose on the successful defence of her PhD thesis entitled, "Emperor penguins and Weddell seals: new insights into their ecology and interactions in the Ross Sea, Antarctica".

Fieldwork in Antarctica

Satellite Tracking on Emperor Penguins & Weddell Seals (event K051-A)

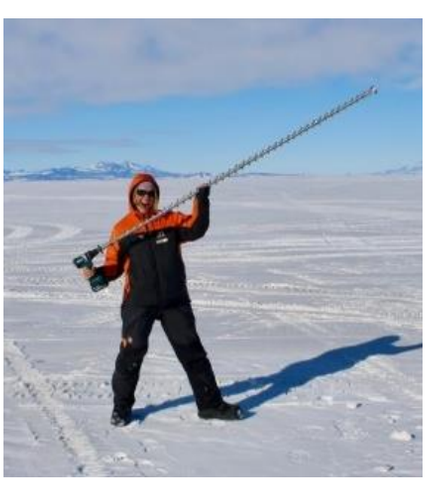
Associate Professor and Rutherford Discovery Fellow, Michelle LaRue, led her field team in Antarctica this year at a sea ice camp at Cape Crozier to deploy satellite tracking devices on Emperor penguins and Weddell seals. Collaborating with colleagues from the United States, over the course of two weeks they successfully put out 20 tags (10 on each species), gathered genetic and environmental samples, and installed a remote camera. This is the first of at least three field seasons, and the team looks forward to analysing the data when it comes in.



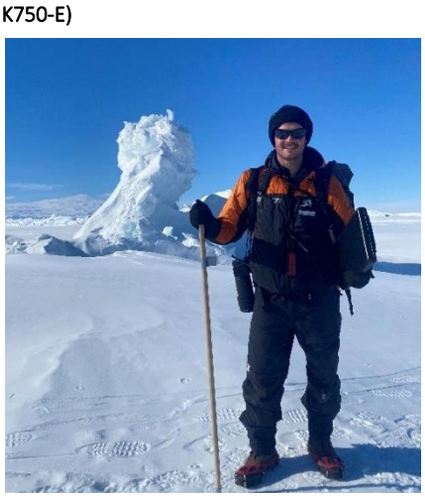
Sea Ice Geophysics (event K892)

Masters of Environmental Science student, **Lizzy Skelton,** spent five weeks in Antarctica in late 2024 as part of her research, in the K892 field team. Her primary role involved towing geophysical instruments behind a skidoo to measure the sub-ice platelet layer (SIPL), a specific layer of ice in McMurdo Sound. This work also included taking measurements along the way using tape measures and Kovacs drills, (as shown in the photo). Lizzy's main objectives were to deepen the understanding of the SIPL, monitor its presence, and track any changes to this environment. Additionally, she contributed to the complex process of coring platelet ice, supporting the broader goals of the K892 team.

The team was fortunate to experience excellent conditions, enabling them to collect data every day at camp. Lizzy described the experience as the most fascinating of her life, with the opportunity to contribute to such world-leading research still feeling surreal. She was blown away by the incredible support she received from her supervisors, the K892 and K053 teams, and even from many people she had just met in the Scott Base dining room. Now, Lizzy's next challenge is to make sense of the data collected during the fieldwork.

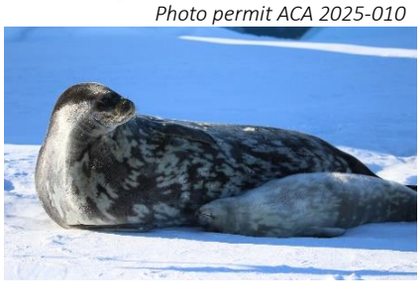


Monitoring Weddell Seals in Antarctica (event K750-E)



Arek Aspinwall is working on his PhD evaluating the stress responses of Weddell seals to Antarctic construction projects. Specifically looking at the impact of Scott Base and its redevelopment on the resident seal population. His research is broad in scope, investigating impacts of behaviour, physiology, and demographics. He hopes that a better understanding of Weddell seal stress responses

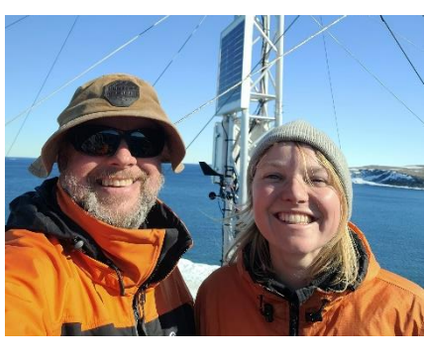
Photo permit ACA 2025-010



will allow for better management of seal populations across Antarctica as well as improved construction practices. As part of this work, he spent a month in Antarctica in Nov 2024, collecting scat and urine samples for hormone analysis.

Sea Ice and Climate Change (event K053)
Wolfgang Rack, Kal Bohn, Daniel Price, Adrian Tan (Lincoln Agritech), Pauline Barras, and **Christian Haas** (AWI Bremerhaven) set out to Scott Base and the Western Ross Sea to measure changes. Three sets of solar-powered instruments were set out on sea ice and the ice shelf, which precisely measured ice dynamics. Since the sea ice and the Ross Ice Shelf are connected, studying this tension and ridging of the sea ice can help us learn about the future behaviour and fate of the Ross Ice Shelf, so even the subtle changes are worth our attention. Sea ice thickness was also monitored, by drilling holes for satellite validation. A new snow radar, developed with Lincoln Agritech was, towed on a sledge. The AEM-bird was operated on a Basler DC-3 aircraft for coastal sea ice thickness measurements. Unfortunately, this part of the experiment might need to be repeated, as we ran into technical problems. This project is funded by the Royal Society Marsden Fund.

Collaborative Meteorological Research in Antarctica (events K881 and K123).



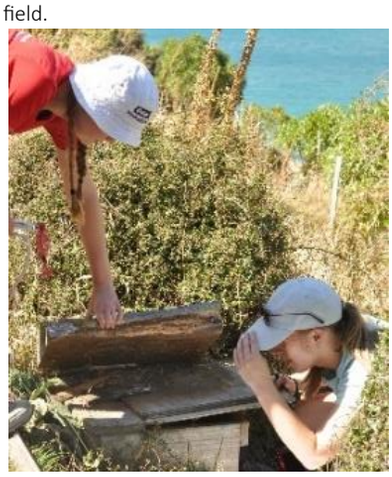
Justin Harrison (UC field technician) and Eva Nielsen (PhD candidate) boarded the Korean research icebreaker *Araon* in November for a joint meteorological research project in Victoria Land. In this research collaboration with KOPRI a weather station has been installed in Inexpressible Island, to monitor fluxes during polynya events. Justin and Eva celebrated Christmas in Antarctica at Korea's Jang Bogo Station before transferring to Scott Base. From there, they continued their work, performing maintenance and downloading data from 18 weather stations. They returned to New Zealand in mid-January.

Erebus Subsurface Geothermal Microbes (event K023)
Craig Herbold and Matthew Stott from the School of Biological Sciences continued their Marsden-funded research investigating the microbial communities in the geothermal soils of Mt Erebus, Antarctica. The team retrieved overwinter *in situ* incubations, and conducting further onsite cultivations and DNA extractions at two locations on the flanks of Mt Erebus, Tramway Ridge and Western Crater. Craig looked at the microbial community found in hot (+65C) soils on Mt Erebus and proposed food preference for the two organisms that are most abundant in the subsurface. The most abundant organism is a novel archaeon that seems to prefer fats and amino acids (think Atkins diet), and the other is a bacterium that seems to prefer carbs and amino acids (think meat and potatoes). The general preference for amino acids but specialized preference for carbon-rich compounds likely reflects the abundance of nitrogen and scarcity of carbon. We also estimated that both organisms are endemic to the site, based on a metric that measures the genetic diversity of bacterial and archaeal populations.

Developing Ice Sampling Equipment for Hot Water Drilled Boreholes (event K062)
Jessica MacFarquhar, UC Engineering, breaks this year's UC record for the length of her research stay. Jess is part of a University of Otago led project (PI Dave Prior), for which she designed and built two ice core drills to be deployed in hot water drilled boreholes on the McMurdo Ice shelf within her Master's of Mechanical Engineering. Her UC supervisor is Geoff Rodgers in the mechanical engineering department.

Fieldwork in NZ

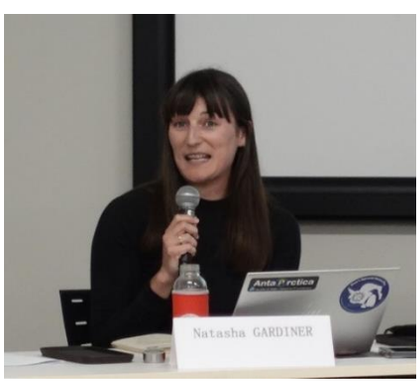
Monitoring Kororā at Pōhatu
Masters students **Georgia Gwatkin** and Alexandra Strang have been part of a long-term monitoring project of little penguins/ kororā (*Eudyptula minor*) at Flea Bay, Banks Peninsula. The project is in collaboration with the Helps Pōhatu Conservation Trust and the University of Canterbury, including Dr **Rachel Hickox**, Dr Sarah Flanagan (UC), and Assoc. Prof. Michelle LaRue (UC). Georgia and Alexandra have been involved in the weekly monitoring and data collection and have both received training for handling and microchipping. Microchipping allows individual life histories to be recorded and is important for gaining a better understanding of population trends and dynamics. The monitoring programme has sparked the initiation of several postgraduate research projects, including Georgia's own Masters research, providing students with the opportunity to gain valuable experience in the field.



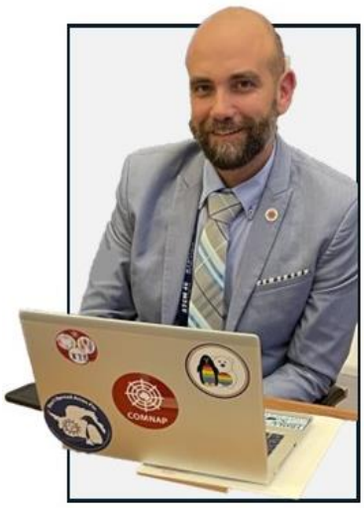
Conferences

SCAR OSC, Pucón, Chile
In mid-August 2024, a sizable contingent of Gateway Antarctica staff (5), postdocs (3), adjuncts and research students (5) travelled to Pucón, Chile, to participate in the Scientific Committee on Antarctic Research's (SCAR) Open Science Conference (OSC). Our team presented a total of 34 presentations / posters, participated in panel and plenary discussions and chaired several sessions across a wide range of disciplines.

KOBE PCRC Antarctic Symposium
PhD Candidate, Natasha Gardiner, was recently invited by the Polar Cooperation Research Centre (PCRC) at Kobe University, Japan, and the Korea Polar Research Institute (KOPRI) to speak at an Antarctic Governance Workshop in Japan. She spoke about the important role of science in Antarctic environmental decision-making, as well as some of the challenges and opportunities that currently exist at the Antarctic science-policy interface. Natasha attended the workshop in both her University of Canterbury research capacity and in her role as a Senior Environmental Advisor at Antarctica New Zealand and New Zealand representative to the Committee for Environmental Protection (CEP). The workshop provided an excellent opportunity to meet and connect with Japanese officials, including Natasha's counterparts in the Japanese Ministry of the Environment. It also provided a fantastic opportunity for informal discussions among Antarctic governance experts from both the academic and practitioner communities-the kinds of interactions at the science-policy interface that she lives for!



Alumni Corner



Dr Andrea Colombo gained his Ph.D in Antarctic Studies from Gateway Antarctica in 2018 with a thesis focussing on the international cooperation and international relations of Asian countries in Antarctica. Andrea's thesis discussed the achievements obtained by Asian Forum for Polar Sciences (AFoPS) in the Antarctic community and how AFoPS, as a regional group, is positioning itself from a policy making and knowledge outcomes point of view. Andrea has been supervised by Professor Daniela Liggett and Professor Anne-Marie Brady.

Currently, he is the Engagement, Information and Project Manager | Deputy Director of the Secretariat for COMNAP. Since 2017, Andrea has been COMNAP Delegate to the Antarctic Treaty Consultative Meetings (ATCMs), the COMNAP representative to the Committee for Environmental Protection (CEP), and also attended the annual meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Scholarships

It is a pleasure to announce the recipients of this year's Christchurch City Council (CCC) and NZ Ministry of Foreign Affairs and Trade (MFAT) Antarctic scholarships. Because we had several outstanding applications, we decided to split the CCC scholarship in half.

CCC: Emilija Reuter**:** *Abundance, Distribution, and Habitat Use of Eastern Antarctic Marine Predators: Insights for Conservation Measures and Fisheries Management.*

CCC: Arek Aspinwall**:** *Investigating the impacts of the Scott Base redevelopment project on the Weddell seal population directly outside the station.*

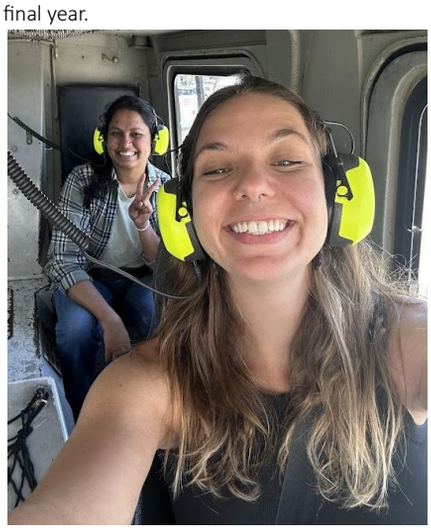
MFAT: Eva Nielsen**:** *Regional distribution and meteorological drivers of extreme temperature events in Antarctica.*

Link to donate to support Gateway Antarctica research!

Visitors

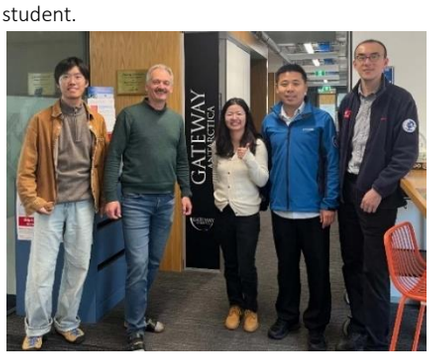
Yousra Makanse from the Netherlands

Since November, we have been hosting **Yousra**, a visiting PhD candidate from Wageningen University. Her research focuses on exploring and mapping the diversification of Antarctic tourism and the integration of the fundamental principles and values of the Antarctic Treaty System in the development of new, novel, or concerning activities. Yousra is part of the ProAct (Proactive Management of Antarctic Tourism) project and is in her PhD's final year.



Wuhan University and the Chinese Arctic and Antarctic Administration (CAAA)

Assoc. Prof. **Jiachun An** is a glaciologist from the Chinese Antarctic Centre for Surveying and Mapping and visiting since August. Dr **Chuxia Yu** started her visit in the School of Law in January. She will work on the Law of the Sea with Prof. Karen Scott over the next few months. The visits are supported by the Chinese Scholarship Council (CSC). In January, the *Xuelong 2* icebreaker arrived in Lyttelton harbour with Dr **Aimin Lyu**, Vice Director of the CAA in Bejing. He visited UC with a PhD student.



Qianyi Zhang, Wolfgang Rack, Chuxia Yu, Aimin Lyu, Jiachun An (left to right)

Other Public Presentations

Public outreach and communication in and beyond Christchurch is important for Gateway Antarctica and a passion of Adjunct Senior Fellow Dr Ursula Rack and Prof Adrian McDonald**.** They gave public presentations to a huge crowd for the University of Third Age in Darfield. Ursula also presented to the Rotary Club in Christchurch for a large audience.

- Fascination Antarctica: landscape, science, and its history (U3A)
- Climate change in Antarctica (U3A)
- A passion for history and Antarctica (Rotary Club).

Postgraduate Certificate in Antarctic Studies (PCAS)

Applications are now open for 2025

PCAS is an internationally unique degree programme that has been developed by University of Canterbury staff in collaboration with business, government, industry, iwi, and non-profit organisations working in Antarctica and the Antarctic community in Christchurch, including with Antarctica New Zealand. As part of the programme of studies, students work directly with Antarctic organisations to apply discipline-specific skills and growing knowledge of Antarctica during Antarctic community placements.

https://www.canterbury.ac.nz/study/academic-study/qualifications/postgraduate-certificate-in-antarctic-studies

Celebrations

Antarctica Day

On 2nd December, Gateway Antarctica, the COMNAP secretariat, and our colleagues at Waterways got together to celebrate Antarctica Day. This unofficial but internationally celebrated festivity marks the anniversary of the signing of the Antarctic Treaty on 1st December 1959.

This was an educational, entertaining and social gathering, as we enjoyed listening to the Antarctic adventures of two PhD students, Kal and Pauline, who have recently returned from doing field work in Ross Island and vicinity, and who had amazing encounters with the 'monarch of Antarctica', the Emperor penguins. Also, the education team from Antarctic Heritage Trust joined us to showcase their newest VR experience, Scott's Discovery Hut.

Polar Pride

On 18 November 2024 many from the School of Earth and Environment joined together to show support for 'Polar Pride Day'.