

# Matthew D. TANKERSLEY

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OBJECTIVE: A recent Ph.D. graduate specialized in airborne geophysical analysis and inversion applied to the cryosphere, with a dedication to conducting open-source and reproducible science.

## EDUCATION

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### Geophysics — *Ph.D. (submitted)*

SEPTEMBER 2019 - JUNE 2023

Airborne Geophysical Investigation beneath Antarctica's Ross Ice Shelf  
Antarctic Research Center, Victoria University of Wellington, New Zealand

### Geology — *Bachelor of Arts (with distinction)*

AUGUST 2014 - MAY 2018

distinction in Geology (GPA 3.7) and a minor in Physics (GPA 3.9)  
Thesis: "Aerogeophysical Analysis of Crustal Structures under the Ross Ice Shelf"  
Colorado College, Colorado Springs, USA

## WORK EXPERIENCE

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### Victoria University of Wellington — *Teaching assistant*

FEBRUARY 2021 - JUNE 2022

- Developed coursework for and led laboratory and fieldwork portions of 3rd-year undergraduate courses **Applied Geophysics** and **Field Geophysics**.

### Colorado College — *Paraprofessional of Geology*

AUGUST 2018 - JUNE 2019

- Planned, led and evaluated laboratory portions of undergraduate geology courses.
- Organized logistics for up to week-long field trips for 20+ students.

### Lamont-Doherty Earth Observatory — *Summer Intern*

JUNE 2017 - AUGUST 2017

- Analyzed correlations between properties of Greenland glacial earthquakes (magnitudes and force azimuths) with seasonality and calving front positions; utilizing **Python**, **Generic Mapping Tools**, and **Landsat imagery**.
- Worked with Dr. Kira Olsen and Dr. Meredith Nettles.

### USGS — *Summer Intern*

JUNE 2016 - AUGUST 2016

- Collected ground-based **gravity and magnetic** data and conducted geologic mapping to aid in a geothermal play fairway analysis of the Pacific Northwest of the USA.
- In conjunction with Colorado College, the USGS, and Washington State DNR.

## AWARDS AND HONORS

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|---|------|---|-----------|
| • 2nd best poster award at the New Zealand-Australia Antarctic Science Conference | 2023 | • Antarctic New Zealand Doctoral Scholarship  | 2020-2022 |
| • SCAR-INSTANT ECR travel grant   | 2023 | • Antarctic Science Platform PhD Scholarship  | 2020-2023 |
| • New Zealand-Australia Antarctic Science Conference student travel grant         | 2023 | • Estwing Outstanding Senior Geologist Award  | 2018      |
| • Arnold Heine Antarctic Research Award   | 2023 | • William A. Fischer Family Scholarship       | 2018      |
| • Endowed Development Fund  | 2022 | • Witter Family Fund                          | 2017      |
| • NZ Antarctic Science Conference travel grant                                    | 2021 | • Patricia Buster Research Scholarship Fund   | 2016      |
|   |      | • Dean's list, Colorado College (4 semesters) | 2014-2018 |

## PUBLICATIONS

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### PEER-REVIEWED SCIENTIFIC ARTICLES

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|------|---|
| 2022 | <b>Basement Topography and Sediment Thickness Beneath Antarctica's Ross Ice Shelf</b> , <i>Geophysical Research Letters</i><br>Matthew Tankersley, Huw Horgan, Christine Siddoway, Fabio Caratori Tontini, and Kirsty Tinto.<br>doi: 10.1029/2021GL097371 |
|------|---|

- 2019      **Ross Ice Shelf response to climate driven by the tectonic imprint on seafloor bathymetry**,  
*Nature Geoscience*  
 Kirsty Tinto, Laurence Padman, Christine Siddoway, Scott Springer, ... Matthew Tankersley  
 doi: 10.1038/s41561-019-0370-2

## IN-PREP SCIENTIFIC ARTICLES

- 2023      **Gravity inversion: a tool for bathymetry modelling**,  
 Matthew Tankersley, Huw Horgan, and Fabio Caratori Tontini.
- 2023      **Bathymetry depths and uncertainties beneath Antarctica's Ross Ice Shelf**,  
 Matthew Tankersley, Huw Horgan, and Fabio Caratori Tontini.

## PRESENTATIONS

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### ORAL PRESENTATIONS

- 2023      **Addressing bathymetry uncertainty beneath the Ross Ice Shelf**, *New Zealand-Australia Antarctic Science Conference, Christchurch, NZ*
- 2021      **Sediment thickness and basement depths beneath the Ross Ice Shelf from aeromagnetic data**, *New Zealand Antarctic Science Conference, Christchurch, NZ*

### POSTER PRESENTATIONS

- 2023      **(Upcoming) Gravity inversion as a method to recover sub-ice shelf bathymetry; applied to the Ross Ice Shelf**, *Scientific Committee on Antarctic Research, Instabilities & Thresholds in Antarctica (SCAR-INSTANT), Trieste, Italy*
- 2022      **Revealing sub-ice shelf sediment basins with airborne magnetics**, *West Antarctic Ice Sheet (WAIS) Conference and Workshop, Estes Park, CO, USA*  
 Poster: <https://doi.org/10.6084/m9.figshare.21172042.v2>
- 2022      **Antarctic-Plots: A Python package to help download, visualize, and present Antarctic datasets**, *The Future of Geodetic-Geophysical Observational Networks in Antarctica Workshop (SCAR-INSTANT), Fort Collins, CO, USA*  
 Poster: <https://doi.org/10.6084/m9.figshare.21183931.v3>
- 2021      **New Contribution to Ross Ice Shelf (Antarctica) Boundary Conditions: Basement Depths and Sediment Thickness Determined from Aeromagnetic Data**, *AGU, virtual participation, presented by Christine Siddoway*  
 Abstract: <https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/988486>
- 2020      **Broad basement structures under Antarctica's Ross Ice Shelf revealed from aeromagnetic data**, *AGU, virtual participation*  
 Abstract: <https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/714573>
- 2020      **Constrained geopotential modelling of the ocean cavity and geology beneath the Ross Ice Shelf**, *Geoscience Society of New Zealand annual conference, Christchurch, NZ*  
 Abstract: <https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/714573>
- 2018      **Aerogeophysical analysis of crustal structures under the Ross Ice Shelf**, *AGU, Washington D.C., USA*  
 Abstract: <https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/442287>

## FIELD WORK

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**Geophysical field assistant** — *Antarctica - Kamb Ice Stream* NOVEMBER 2019 - DECEMBER 2019

- Worked within a team of 5 stationed in a remote field camp on the Ross Ice Shelf conducting an **active source seismic survey** and a **gravity survey**.
- Included training and extensive use of snowmobiles, Hagglund tracked vehicles, transport, wiring, and detonation of explosive charges, operation of a hot water drill for emplacing charges at a 20m depth, and deploying a 1 km array of geophones.
- Other duties included **planning and executing the gravity survey**, GNSS surveying the gravity and seismic stations, and setting up and maintaining camp infrastructure.

**Geophysical field assistant** — *Antarctica - Discovery Deep* DECEMBER 2021 - FEBRUARY 2022

- Similar to above but in a field camp consisting of just our team of 5. Additional survey methods included seismic surveying with a streamer of geophones and surface detonation of det-cord.
- Shared all duties of our self-contained camp (cooking, cleaning, camp safety etc.).

**Marine Seismic Assistant** — *RV Tangaroa - TAN2006* JULY 2020 - AUGUST 2020

- Worked aboard the RV Tangaroa conducting a **marine seismic** and **multibeam bathymetry** survey of the Chatham Rise, New Zealand.
- Duties included monitoring seismic data collection and pre-processing of multibeam bathymetry data.

**Geologic Fieldwork** — *Western USA* 2014 - 2018

- Over 100 days of geologic fieldwork throughout the Western USA during my undergraduate degree. This included geologic and structural mapping, stratigraphic profiles, and soil and rock sample collection.

## OPEN-SOURCE SOFTWARE DEVELOPMENT

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Since 2022      **Fatiando a Terra: Open source tools for geophysics**  
Contributor  
<https://www.fatiando.org>

Since 2022      **Antarctic-Plots: Functions to automate Antarctic data visualization**  
Founder and core-maintainer  
<https://antarctic-plots.readthedocs.io/en/latest/>

## TECHNICAL SKILLS

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**Programming** Python, GMT

**Python packages** Pandas, Xarray, NumPy, SciPy, Dask, PyGMT, Matplotlib, Plotly, Pooch, Verde, Harmonica, Optuna, GeoPandas, Shapely

**Markup** Markdown, L<sup>A</sup>T<sub>E</sub>X, Curvenote

**OS** Linux, Windows

**Other tools** Geosoft Oasis Montaj, Jupyter Notebooks, git, GitHub, VS Code, Binder, ReadTheDocs, QGIS, LibreOffice Suite, Microsoft Office Suite

## REVIEWER

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New Zealand Journal of Geology and Geophysics

## QUALIFICATIONS

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**First Aid Level 1** St John, Wellington, Nov 2022

**Backcountry Avalanche Course** New Zealand Snow Safety Institute, Sep 2021

**Basic Snowcraft Course** New Zealand Alpine Club, Aug 2021

**Wilderness First Aid Course** National Outdoor Leadership School, 2019

**AIARE 1 Avalanche Safety Course** Colorado College, 2018

## RECREATIONAL INTERESTS

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**Outdoor recreation** Mountaineering, backcountry skiing, rock climbing, hiking, mountain biking

**International travel** Having lived in 6 countries across 5 continents, I have a keen interest in international cultures and easily adapt to new locations.