Glaciology Resource Map
Developed by the MARS Glaciology URGE Pod and adapted from the “Sample Phd. Mentoring Plan” developed by Dr. Vashan Wright (WOHI) and Dr. Karin Block (CUNY) CC BY-NC-SA 4.0.

This resource map is designed to provide general information and resources outside of any one University or Institution. In addition to providing links to existing resources and programs, we also provide descriptions of where you can generally look for resources at your home institution as well as providing example resources (e.g. mentoring contract, field supply lists)

Application and Hiring

Graduate School

GeoGradApp Tips and Graduate Application Timeline

Visit the websites of individual professors or research groups to find potential openings and information on past projects. Reach out to people you are interested in working with in late-summer early-mid Fall to find out if they have funding. Even if a professor does not currently have funding, they may give you advice on who else to reach out to.

Before accepting any graduate position, reach out to your potential advisors, current or past graduate students to find out more about the lab environment. By talking to current or past graduate students candidly, you will be able to decide if that lab is a good fit for you and for your goals.

Letters of Recommendation

Resource - Avoiding Gender Bias in Letters of Recommendation (link) (link) The Right Words for the Job: How Gendered Language Affects the Workplace - D. Liu
Mentoring and Leadership

For a good mentor-mentee relationship there needs to be a clear goal. Mentor relationships can be established over short periods for specific goals or long term relationships to help you navigate your career.

Mentoring Plan & Contracts

Below are some mentoring contract examples to use if you are entering a Mentor-Mentee relationship in either role.

Mentoring contract [link] (i.e., with a student and their advisor)
Individual Development Plan (IDP, link)

Building a lab

Ten simple rules for building an anti-racist lab - Chaudhary & Berhe

Resources

Outdoor Leadership - John Graham

Teaching and pedagogy

Content

GeoContext a social and political context for geoscience education
GeoSci open-source geoscience learning resources
EarthPy open source Python package helping users use spatial data
EarthLab data-intensive open, reproducible environmental science
Earth Data Science courses, tutorials, and tools (R & Python)

Tools

ABC-classroom Python tool making it easier to clone and access student submissions and return feedback to GitHub
matplotlib Python tool that allows teachers to automatically test matplotlib plots for data accuracy, legends, titles, etc.
nbgrader Jupyter tool that allows creating and grading assignments in a Jupyter notebook

• Diversity & Inclusive Teaching resources from the University of Michigan Center for Research on Learning and Teaching
• How to be an anti-racist educator by Dena Simmons
• CIRTL Network resources for inclusive teaching
• Remote Academia 2020 Slack Doc & Reading List - compiled by Princeton CITP
• Creating Inclusive Virtual Spaces
Core work resources

Code of conduct and communication plan

Fieldwork

**INTERACT - Practical Field Guide 2ed**

Responsibility of Advisor/PI

▫ The advisor should provide a field safety discussion and provide for specific required safety training.
▫ For remote field work you can ask that your advisor provide you with a personal communication device (e.g., **Garmin InReach**)

Personal Equipment Checklists

▫ **AntarticGlaciers: How to enjoy a successful fieldwork expedition**

Reporting Policy

**Cryosci.Listen** a space for anonymous feedback on the health of the cryospheric science community. (e.g., cryosphere-wide ombudsman).

Resources in development (as of 2021 Apr 30): **post-conference survey** and **post-fieldwork survey**

**SAHPR Program** U.S. Antarctic Program’s Sexual Assault/Harassment Prevention and Response Program

**AGU Resources**

Code of Conduct Examples

**ADVANCEGeo Partnership** - [Example](#)
**A Code of Conduct for Open Source Communities** - [Example](#)
**NSF Polar code of conduct**
**AGU’s CoC** - [here](#)
**Online meetings** ([Mozilla, AGU](#))

Community Support

**Ice & Snow Graduate Student Community** ([Slack](#))
**Earth Science Women's Network** ([ESWN](#)) - Discussion Group on facebook

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1 Principal Investigator - individual designated to be responsible for the scientific or technical direction of a funded scientific project. NSF designated PI responsibilities can be found [here](#).
Mental Health Resources
Most colleges and universities have free or very affordable counseling services at the on-campus health center. Counselling (even if it is on campus) is always confidential.

Professional development resources

Media Training

Workshops

AAAS Communicating Science Workshop—$125
AGU List of Resources
Creating Inclusive Virtual Spaces

Writing
University libraries typically have workshops covering proposal writing, creating a CV, publishing, etc.

Proposals
  • NSF Proposal & Award Policies & Procedures Guide

Books
  • Writing Science: How to write papers that get cited and proposals that get funded - Joshua Schimel (blog)
  • Line by Line: How to edit your own writing - Claire Kherwalk Cook

Articles
  • Five common writing mistakes new scientists make - J. Gill
  • What Hollywood can teach researchers about scientific storytelling - J. Ettinger
  • 11 steps to structuring a science paper editors will take seriously - A. Borja
  • 10 simple rules for structuring papers - B. Mensh, K. Kording
  • Avoiding the official style - C. Wilke
Networking

Resources

Kick-starting scientific collaborations remotely - J. Lowndes, C. Kappel & J. Brun
AGU Cryo Meet up
Ice & Snow Graduate Student Community Slack

Seminar, Presentation, and Professional Networking Opportunities

- MARS: Midwest and Random Stragglers Glaciology Group—weekly
- Northwest Glaciologists—annual conferences
- International Glaciology Society's Global Seminar Series—weekly

Professional Organizations

- GeoLatinas: Latinas in Earth and Planetary Sciences
- SACNAS: Advancing Chicanos/Hispanics & Native Americans in Science*
- AISES: American Indian Science and Engineering Society
- Geoscience Alliance: Native Americans in Geoscience
- AAWG: African Association of Women in Geosciences
- Black Geoscientists
- GAIA: Network for Women in Earth Sciences
- NABGG: National Association for Black Geoscientists and Geophysicists
- NABG: National Association of Black Geoscientists*
- SCWIST: Society for Canadian Women in Science and Technology
- ESWN: Earth Science Women Network
- AWG: Association for Women Geoscientists
- AAAS: American Association for the Advancement of Science
- SOLESS: Society of Latinx/Hispanics in Earth & Space Sciences
- GSA: Geological Society of America
- IAGD: International Association for Geoscience Diversity*
- WGC: Women Geoscientists in Canada
- NSBE: National Society of Black Engineers

Polar/Glaciology Specific

- Pride in Polar Science Network
- IGS: International Glaciological Society
- AGU: American Geophysical Union - Cryosphere*
- APECS: Association of Polar Early Career Scientists

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2 Additional organizations can be found here
3 Annual conference
4 persons with disabilities in the geosciences
Programming, Modelling, and Data

Programs & Projects
Earth Surface Processes Institute—Espin Summer School
Software Underground—Connecting geo/computing researchers
GeoHackWeek—Workshop in Geospatial Data Science (UW)

Resources—*for learning and teaching*
Open Education Resources Jupyter, Git & Github, Bash, etc.
PyOpenSci peer-review of scientific Python packages
A Complete Guide to Documenting Python Code

Data Visualization
- Articles
  - Co-designing scientific information for the IPCC
- Python Packages
  - Matplotlib (cheat sheets)
  - Plotly (article)
  - Seaborn
  - Bokeh
- CSDSM Python Summer School

Colors
- Colorblindness simulation tool
- Optimizing colormaps with consideration for color vision deficiency to enable accurate interpretation of scientific data - Nunez et al., 2017
- Color map advice for scientific visualization
- Scientific color maps - Fabio Crameri
- Perceptually uniform colormaps (colorcet)

ArcGIS/QGIS
- QGreenland

Data Management
CARE Principles for Indigenous Data Governance
FAIR Guiding Principles for scientific data management and stewardship
Summer experiences & field course opportunities

**International Summer School in Glaciology**
Timing       Bi-annual, ~2 week program typically held in June.
Applications due in January of the program year.
Eligibility  Graduate students in glaciology worldwide (MSc or PhD)
Cost         Most costs are covered and travel grants available.

**Juneau Icefield Research Program (JIRP)**
Timing       Annual, variable lengths during the summers (June–August)
Eligibility  **Participant**: Undergraduate
             **Faculty and Research**: Graduate (Phd/Postdoc preferred)
             **Staff**

**The University Centre in Svalbard (UNIS)** Field courses
Eligibility  **Participant**: Undergraduate & Graduate
             **Faculty and Research**
             **Staff**

Example Courses that are relevant glaciology/climate change
AG218 - International Bachelors Permafrost Field Course (undergrad)
AG220 - Climate Change in the High Arctic Landscape of Svalbard (undergrad)
AG221 - Arctic Physical Geographical Field Techniques (undergrad)
AG325 - Glaciology (graduate level)
AG330 - Permafrost and Periglacial Environments (graduate)
AG340 - Glaciers and Melt Season Dynamics (graduate)
AG346 - Snow and Avalanche Dynamics (graduate)
AG350 - Arctic Glaciers and Landscapes (graduate)
AGF211 - Air-Ice-Sea Interactions (undergrad)
AGF212 - Snow and Ice Processes (undergrad)
AGF311 - Air-Ice-Sea Interactions 2 (graduate)
AGF312 - Remote Sensing of the Cryosphere (graduate)
**Funding**

**Undergraduate**
- **Adobe Research Women-in-Technology Scholarship**: Undergraduate or Masters students at North American Universities—$10,000
- **Association for Women Geoscientists Minority Scholarship**: Black, Hispanic, or Native American, female, full-time students pursuing an undergraduate degree in geoscience—$6,000
- **Expanding Representation in Geosciences (ERG) Scholarship**: Undergraduate—$1,500

**Graduate**
- **NSF Graduate Research Fellowship Program (GRFP)** - annual
- NASA: **Internships and Fellowships** - annual
- **The John Hunter Excellence in Plotting Competition** - annual
  SciPy (Python) plotting contest—$1,000, $750, or $500

**Post-Doctoral & Early Career**
- NSF: **Office of Polar Programs (OPP)**, with a list of active funding opportunities for Polar programs
- NASA: **Internships and Fellowships** - annual

**General/Other**
- **The John Hunter Excellence in Plotting Competition** - annual
  SciPy (Python) plotting contest—$1,000, $750, or $500
- **National Science Foundation**

**Outreach resources**
- [http://www.antarcticglaciers.org/](http://www.antarcticglaciers.org/)
- Inspiring Girls Expeditions—Girls on Ice
Field work

Fieldwork Resources
- **Tips & Tricks for going to the bathroom and other bodily functions in the field** - Dr. Chris Carr
- **INTERACT Fieldwork Planning Handbook**
- **Safe fieldwork strategies for at-risk individuals, their supervisors and institutions** - Demery & Pipkin (2021)
- **MARS Field Safety Plan** [link]
- **Six simple steps to make fieldwork more accessible and inclusive** - A. Lawrence

Field experience and training

Course Types
- Crevasse rescue, glacier travel, avalanche safety and rescue, Bear Safety, Wilderness First Responder (WFR) ([NOLS](https://www.nols.edu), [American Alpine Institute](https://www.americanalpine.com), [Wildmed](https://www.wildmed.org))

Finding a course

Some of these short courses may be useful depending on your specific fieldwork goals and line of research. Below are a list of some organizations that are found throughout the country that have affordable courses that are generally open to the public. Universities (especially those situated in the north) may also have similar or more extensive course offerings through their outdoor recreation departments, these classes are usually geared towards students and are very affordable.

- **American Alpine Club**
  The organization has [resources and videos online](https://www.americanalpine.com). Individual clubs typically offer very affordable training in basic rope skills, ski mountaineering, crevasse rescue, and various other classes.

- **REI stores**
  Located throughout the US and offer a wide variety of free or very affordable classes. This includes in-person and more recently virtual classes on subjects ranging from bear safety and navigation to more technical classes in climbing and snow travel.

Climbing and mountaineering schools across the country offer courses in relevant skills.

Check your school’s outdoor program for **low cost outdoor gear rentals.**
JEDI & Decolonization

- Intersectionality as a Blueprint for Postcolonial Scientific Community Building—C. Prescod-Weinstein (2016)
- Towards reconciliation: 10 Calls to Action to natural scientists working in Canada—C. Wong (2020)
- ADVANCEGeo
- Creating Inclusive Virtual Spaces

- Indigenous Names for Alaskan Locations
- In Canada, Inuit Communities Are Shaping Research Priorities—M. Halliday (2020)
- United States Indigenous Data Sovereignty Network
- CARE Principles for Indigenous Data Governance
- NativeLand.ca—find out more about the lands you inhabit

Books