

# PENELOPE HOW

Data scientist, Ph.D.

📍 Nuuk, Greenland

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🔗 pennyhow.github.io

🌐 PennyHow

🐦 DrPennyHow



## OVERVIEW

Data scientist based in Nuuk, Greenland with a strong background in cryospheric sciences. Extensive skills in programming, including the development of the pypromice package for operational data production from the PROMICE and GC-Net automated weather station network. Distributed two open-source photogrammetry software (Pointcatcher, PyTrx) for extracting physical measurements from optical imagery during M.Sc. and Ph.D. education. Accomplished glacier fieldworker in Greenland, Svalbard and Iceland. Experienced operating in diverse working environments, from teamwork in small groups to collaborations in international project consortiums.

## EXPERIENCE

### Data scientist

**Geological Survey of Denmark and Greenland (GEUS), Greenland**  
2021–present

- Mainly focused on data production from automated weather stations
- Responsible for operational processing from over 30 weather stations located on the Greenland Ice Sheet
- Production and maintenance of Python packages
- Documentation and dissemination of programming resources to researchers
- Coordination of department activities with Greenland research institutes and partners

### Remote Sensing Specialist

**Asiaq Greenland Survey, Greenland**  
2019–21

- Using remote sensing to monitor the landscape of Greenland, including ice sheet change, hydrology, and permafrost
- Responsible for the automisation and documentation of scientific pipelines, data visualisation, and statistical analysis
- Projects included the ESA Glaciers CCI ('An Inventory of Ice Marginal Lakes in Greenland'), and the ESA Greenland Ice Sheet CCI+ (responsible for data processing and analysis of supraglacial lake changes in Greenland)

### Postdoctoral Research Associate

**University of York, UK**  
2018–19

- Appointed to the project 'Archival Polar Photography - Unearthing the Forgotten Record of Glacier Change'
- Implemented photogrammetry and computer vision techniques to extract measurements from archive imagery and examine glacier change in Greenland

## SKILLS

Python

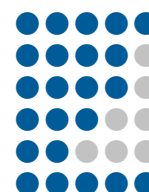
Bash

Javascript

Matlab

IDL

LaTeX



Linux

Apple

Windows



## EDUCATION

Ph.D. Atmospheric and  
Environmental Sciences

**University of Edinburgh, UK, 2014-18**

Thesis title: Dynamical change at tidewater glaciers examined using time-lapse photogrammetry

External Ph.D. candidate

**University Centre in Svalbard, Svalbard, 2014-18**

Field demonstrator and lecturer for Glaciology (AG-325 and AG-347) and Remote Sensing of the Cryosphere (AGF-312) courses

M.Sc. (By Research) Environmental  
Science

**Lancaster University, UK, 2012-13**

Dissertation title: Measuring glacier movement and its influences using a new approach in terrestrial time-lapse techniques

B.Sc. (Hons) Physical Geography  
(4-year Australasia course)

**Lancaster University, UK, 2008-12**

First class degree. Dissertation title: Linking glacier hypsometry to meltwater isotopic composition

## GRANTS/AWARDS

ESA Living Planet Fellowship (2021–24)

[Examining Greenland's Ice Marginal Lakes Under a Changing Climate \(GrIML\)](#)

UK–Greenland Arctic Research Bursaries Scheme (2023)

[A flagship glacier-fjord monitoring programme in Nuup Kangerlua](#)

University of Edinburgh Postdoctoral & Early Career Researcher Exchanges (2016)

[Ph.D. placement at Norwegian Polar Institute, Tromsø](#)

University of Edinburgh Meiklejohn Fund (2016)

[Examining calving dynamics at a surge-type glacier in Svalbard using terrestrial time-lapse photogrammetry](#)

University of Edinburgh Moray Endowment Fund (2015)

[Monitoring glacier-volcano interactions at the Mýrdalsjökull ice cap, Iceland, using permanent terrestrial time-lapse platforms](#)

## SELECT PUBLICATIONS

- **P How** et al. (2021) Greenland-wide inventory of ice marginal lakes using a multi-method approach. *Scientific Reports* 11, 4481. doi:10.1038/s41598-021-83509-1
- **P How** et al. (2020) PyTrx: A Python-Based Monoscopic Terrestrial Photogrammetry Toolset for Glaciology *Frontiers in Earth Science* 8, 21. doi:10.3389/feart.2020.00021
- **P How** et al. (2018) Calving controlled by melt-under-cutting: detailed calving styles revealed through time-lapse observations. *Annals of Glaciology* 60, 113–127. doi:10.1017/aog.2018.28
- **P How** et al. (2017) Rapidly changing subglacial hydrological pathways at a tidewater glacier revealed through simultaneous observations of water pressure, supraglacial lakes, meltwater plumes and surface velocities. *The Cryosphere* 11, 2691–2710. doi:10.5194/tc-11-2691-2017

## FURTHER EDUCATION

SAR and InSAR processing course (2019)

[GAMMA Remote Sensing, Switzerland](#)

Python object-oriented computing design (2015)

[University of Edinburgh M.Sc. course, UK](#)

Mini- and micro-uncrewed aerial vehicles (UAVs) for the Environmental Sciences (2014)

[NERC Advanced Training course hosted by Scottish Association for Marine Science \(SAMS\), UK](#)

## MOST PROUD OF



**PyTrx software published, 2020**  
My first object-oriented Python package peer-reviewed in a high-impact scientific journal and officially released for public use

## RESEARCH INTERESTS

Glacier dynamics

Time-lapse photogrammetry

Climate data analysis

Remote sensing

## MEMBERSHIPS

- International Glaciological Society (IGS)
- European Geosciences Union (EGU)

## LANGUAGES

English (mother tongue)

Danish (basic)

## HOBBIES

Sailing

Hunting

Running

Squash

## REFEREES

**Signe Bech Andersen**

Glaciology and Climate section leader  
Geological Survey of Denmark and Greenland (GEUS)

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**Robert Fausto**

PROMICE programme manager  
Geological Survey of Denmark and Greenland (GEUS)

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**Adrian Luckman**

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