

PYRN Short Course

By Adam Kirkwood, Charlotte Haugk

Permafrost scientists and engineers!

Are you interested in learning more about each other's disciplines? Then follow up and rewatch our PYRN Short course on Youtube. This 5 week course was filled with lecture content followed by questions from the audience, and during the last week, all of our panelists joined together to have an interactive discussion on how permafrost scientists and engineers can work together, and identify a strong path forward.

Basics of permafrost science | <https://youtu.be/YQhAu3po1Fg>

Dr. Ashley Rudy introduces the basics of permafrost science, including What is permafrost, permafrost extent, active layer and subsidence, permafrost thermal regime, ground ice, permafrost formation and degradation, permafrost landforms, thermokarst and climate change and permafrost

Basics of cold regions engineering | <https://youtu.be/T77ykHpZvAc>

We continue to exchange knowledge about each other's disciplines. This video is about the basics of cold region engineering I by Dr. Simon Dumais, assistant professor in civil engineering and geotechnical engineer. He covers topics like soil mechanics, heat transfer, the soil thermal state that we need to understand in order to design, construct and maintain infrastructure successfully in permafrost environments.

Basics of permafrost science II <https://youtu.be/fGHsncalJBY>

In this second part about permafrost science II, we welcome Dr. Chris Burn , who talks about field experiments with snow and more especially rejuvenation of ice-wedge cracking at the western Arctic coast. In the second part, Pat Jardine talks about snow compaction on the Dempster highway. Originally, Dr. Hugues Lantuit was scheduled to hold this talk but we had to reorganise due to other engagements. Thank you Chris for stepping in on short notice!

Basics of cold regions engineering II <https://youtu.be/DQueDDOxmNY>

The fourth part about cold regions engineering is given by Guy Doré from the University of Laval, Quebec. He talks about geotechnical investigations that are key to decision making and different strategies for engineering and design on permafrost.

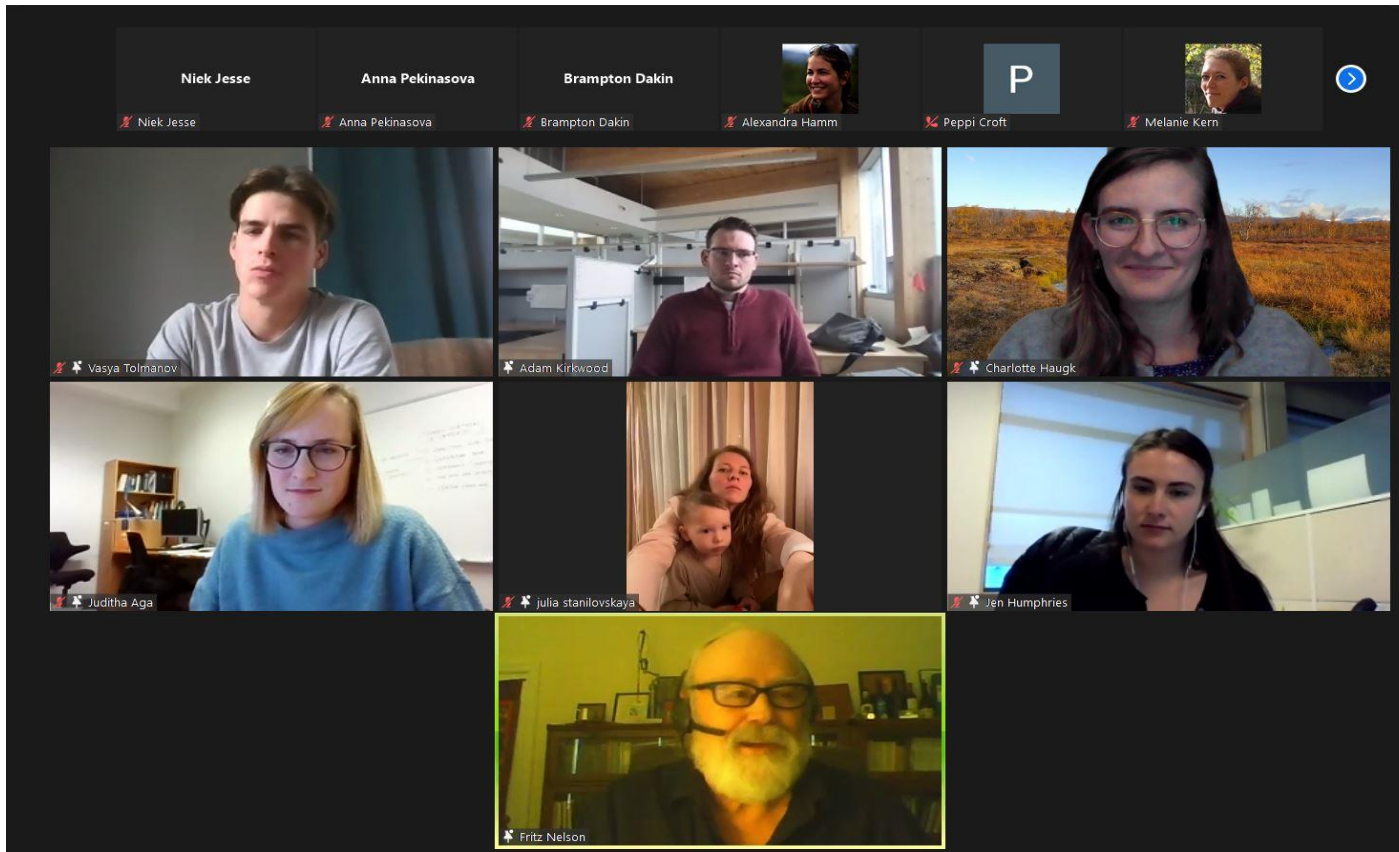
Panel discussion <https://youtu.be/yXeGCzGudeM>

This the fifth and last part of our PYRN Short course on permafrost science and cold region engineering. All 4 panelists that we welcomed in separate session in the past weeks (linked in the same playlist), will be discussing the following questions:

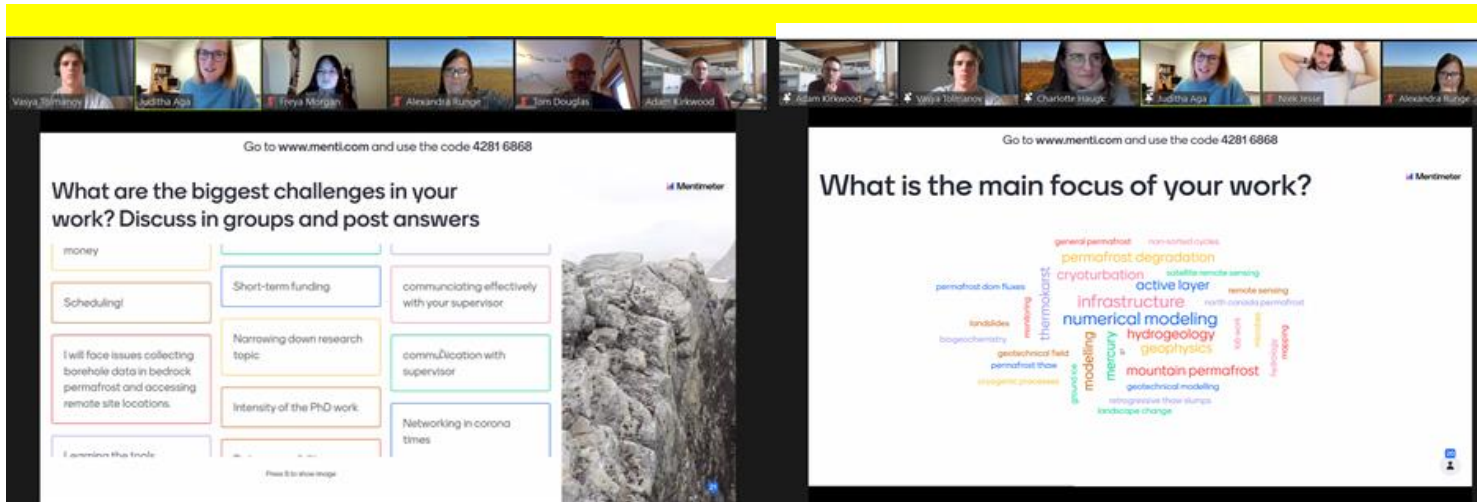
1. Are there already strong working relationships between cold regions engineers and permafrost scientists?
2. What are some of the barriers/complications of permafrost scientists and engineers working together?
3. What can we as a community do to close some of the gaps in communication between permafrost scientists and engineers?
4. What can we learn from each other/should we learn from each other?
5. Are there specific courses/summer schools/field work etc you recommend for interested students?
6. What do you expect from RCOP? What would be your wishes? Do you plan to attend a session by the others?

PYRN at RCOP conference: Student day

By Vasily Tolmanov



Student day of the RCOP 2021 conference was an amazing experience for all young permafrost researchers. In the morning, three generations of permafrost researchers: Dr. Fritz Nelson, Julia Stanilovskaya and Jen Humphries shared their experience about the work-life balance. They discussed the specific aspects of the academic work and compared it with the work in the governmental structures or giant industrial companies. The geography of their current or past jobs was quite impressive: various states of the USA, Canada, France, West Siberia. The second event was an interactive activity prepared by Juditha Schmidt. Participants shared their work experience in the breakout rooms, discussed positive aspects and difficulties of the graduate school and chose their favorite permafrost landforms. The answers were processed in the on-line form and people could see different opinions, the most common responses and the maps of the replies.



In the afternoon PYRN EXCOM organized two lectures/master classes. The first one was the Science design lecture by Andreas Dahlin who spoke on behalf of his own company “Visualize your science” (<https://www.visualizeyourscience.com/pages/vys-course>). He shared his experience and thoughts about the application of different design ideas in the research products, such as papers, posters and presentations. This educational business helps researchers to illustrate their research, to increase visibility and facilitate perception. Andreas provided some hints, advice and secrets and invited all of us to join the spring course : “Visualize your science”.

The second lecture was led by Dr. Stephan Gruber from Carleton University, who shared his rich experience in the writing of grant proposals. He discussed the most common mistakes appearing in proposals of young researchers and provided hints on how to avoid them. The 5 hours of the student day events flew like one minute.

I hope that all participants really enjoyed all the activities as I did. I truly believe that advice given from all of the lecturers will help the young permafrost community in realizing their ideas and embodying them into strong grant proposals and quality papers!

PYRN at RCOP conference: Student awards

By Adam Kirkwood

For the virtual Regional Conference on Permafrost 2021, PYRN organized student awards for the best oral and poster presentations. The competition was fierce with lots of wonderful presentations and posters, but PYRN is happy to announce the winners of best presentations:

Posters:



First - Alexandra Hamm: Alexandra is fascinated by the Arctic, it's glaciers, and the magnificent landscape. Alex is doing a PhD in permafrost hydrogeology to better understand the role of water in permafrost landscapes and improve understanding of climate change impacts on permafrost carbon release. Her poster was titled: *Impact of lateral groundwater flow on hydrothermal conditions of the active layer in a high arctic hillslope setting*



Second - Alexandre Chiasson: Alexandre began his PhD at University of Alberta under the supervision of Dr. Duane Froese in the Fall 2020 after working as research associate at Center for Northern Studies in Québec. His PhD aims to better understand the ground-ice conditions along the proposed Mackenzie valley Highway (MVH) right-of-way in the Northwest Territories. His poster was titled: *Initial investigations of degrading peat plateaus in the central Mackenzie Valley, Northwest Territories*

Oral Presentations:



First - Julius Kunz: Julius is a PhD student at the University of Wuerzburg (Germany) and is interested in landscape evolution in periglacial areas. He is currently working on a multiscale characterization of periglacial landscapes and the three dimensional geophysical investigation of individual periglacial landforms. His presentation was titled: *Three-dimensional investigation of a broad-based closed-system pingo on the Tuktoyaktuk Peninsula, Northwest Canada*



Second - Tabea Rettelback: Tabea is a geodata scientist developing algorithms that help analyze large volumes of remote sensing data to quantify permafrost thaw on pan-Arctic levels. She is currently in the third year of her PhD at the Alfred Wegener Institute in Potsdam, Germany (and enjoying every moment of it). Her presentation was titled: *Quantifying Erosional Dynamics in Ice-Wedge Networks with Computer Vision and Graph Theory*

COP26 - “Commit to optimism”

By Niek Jesse Speetjens

Last November, Glasgow seemed to be the center of the world for a brief moment, as the world’s eyes were pointed toward the United Nations Climate Change Conference, COP26. Many of us were skeptical, including myself, as it seemed that too little had been done too late since the world’s leaders had made promising agreements on climate mitigation in Paris at COP21. As a permafrost scientist I often feel conflicted as on the one hand, I have the hope that our science will contribute to a better world, yet on the other, it is hard to see how wet socks and cool boxes with frozen dirt would mean anything to anyone other than a mad earth scientist. In putting things in perspective, it is wise to turn to our senior peers or perhaps ‘elders’ is a more adequate term.

Being called ‘elder’ might not be exactly what Dr. Paul Overduin, a senior scientist at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) in Potsdam, Germany, was hoping for when I approached him to help me out of my mad scientist melancholy. Yet as a leading scientist in the field of sub-sea permafrost and one of the main speakers during the COP26 Permafrost day at the Cryosphere Pavilion on the one hand and expedition ally on the other, Dr. Overduin seemed exactly the person to turn to. I asked him about his experience at COP26 and where we as permafrost young researchers can find ourselves when ‘the grownups’ of this planet are seated around the table.

The Cryosphere is still somewhat of a strange beast, says dr. Overduin. Although changes are more than evident all around us: dramatic depictions of the annually declining sea-ice, plenty of glaciers having their before and after photographs installed in-situ and ominous projections of cities flooded by several meters of molten Antarctic and Greenlandic ice-sheet. It is clear that the drama of the dwindling cryosphere goes down the media’s belly well.

Yet on the other hand, says Overduin, even at COP26 there are people stating that ‘the cryosphere is only a problem and not part of any solution’. In response Dr. Overduin adds: Countries prefer to talk about forestation, methane reduction, transportation, land use - anything that offers a chance of reducing emissions. What about the cryosphere? “Even if 1.5°C were possible”, said another delegate, “the Arctic will never be the same”. The point seems to be that too few people are yet to see the climate crisis as an entirely global problem asking for holistic global solutions. “True, the Arctic will never be the same, but neither will coastal cities near you” - adds Overduin.

Dr. Overduin started working on Permafrost three decades ago in the early 1990’s. “Permafrost was a strange fringe phenomenon back in the middle of the 20th century. There was this unique organization of passionate people, however, that managed to meet up despite the cold war separation between east and west. “When I started working on permafrost, it was still a bit of a niche. The growing awareness of the danger of anthropogenic climate change, together with the rising voices of indigenous groups and the availability of citizen science, have pushed permafrost out of the dark

into the light. Yet there are many gray areas on the map of our permafrost understanding, says Overduin, and more research is needed. - “There is much potential work together with those living and working on permafrost lands.”

On asking why, when and by whom Dr. Overduin was approached to speak at COP26, he answered that the group working on sub-sea permafrost worldwide is small and that others had declined invitations to speak under the motto of ‘the science is not ready’. The exact chain of connections Overduin doesn’t recall, but the willingness to participate knowing that so much still needs to be discovered is a sign of braveness much needed in science (IMHO). Overduin sees it as a part of his job and an obligation to the tax-payers who funded the science. Yet says speaking at COP26 was definitely something out of the ordinary.

In his talk, Dr. Overduin focused on getting the message across to the broader audience which he describes as “a mix of those involved and informed, and others who were simply interested”. Many are still unaware that permafrost exists under the sea and that it has huge potential to release greenhouse gasses into the atmosphere. “We still need a lot more research to determine how important of an issue sub-sea permafrost is, oil companies might know but they’re just not saying”.

Speaking of broader audiences, an astonishing 35000 people attended the event in real-life and many, many more digitally (if only scientific information could be as contagious as Covid). Dr. Overduin is optimistic about the event and says that he “got the comforting impression that many of these people were there simply because they really, really cared and wanted to make a difference”. While writing this, I realize that this is the kind of information that I want to hear, especially in the middle of tedious exercises like going over and over the same set of results again to produce a paper. It is so important for us as early career scientists to get the feedback that what we do makes its way to the world. “The COP process is hard, endless negotiations, long and sometimes extremely dry presentations in plenary and the results seem too incremental. But I think it is an incredibly necessary process. It's where we have a chance to think and act as a planetary species rather than self-interested nations.” - Overduin adds.

Given his 30 years of experience, I dared to ask Dr. Overduin one of those icky questions that I could imagine debaters would ask to put the scientist to the test: Is permafrost thaw/degradation really as big of an issue or are scientific results exaggerated? Dr. Overduin: “There is, as in most fields, a tendency to oversell one's single field of interest. There are people highly passionate about permafrost, who feel that it is the number one climate issue. Being at COP26 is a good cure for that - there are other components of the climate system reacting quicker, more amenable to change, and much larger in terms of climate forcing than permafrost. We will need to be tactical and opportunistic in mitigation - this requires an outcome-neutral discussion about which climate system components are priorities. Having said that, I do not think that the scientific results are exaggerated - over time, science corrects its own exaggerations. The potential for overshooting emissions by committing to a long-term release of greenhouse gas from permafrost is very real and means century-scale and longer repercussions.”

In the light of placing ourselves among the other climate sciences and asking for the right amount of attention, participating in UN processes is necessary according to Overduin. Yet rather than asking for more attention he suggests that we would be better if we would make sure that the

quality of engagement is appropriate to get permafrost science issues into the right channels. “The IPCC's SROCC (Special Report on the Ocean and Cryosphere in a Changing Climate - <https://www.ipcc.ch/srocc/>) is an example of this beginning to happen. The Arctic Council could play a larger role in coordinating science dedicated to policy at this level.”

An important notion Dr. Overduin got during his 1-day flash visit to COP26 is that “the absolute circus” of national and organizational pavilions, slickly showing off a dedication to climate action, and the fact that the fossil fuel industry had more delegates than any single nation, both left him with the impression that we (humans) are very, very far from dealing adequately with the challenges that face us. “Our hope lies in those on the streets outside of COP26 - those working to generate the political will for transformational change.”

For something that seems so far and big as COP26 I feel that conversations like the one with Dr. Overduin helped me set my bearings in my own career and anchor into the facts of the “state of the art of our science” outside the scientific bubble. As a final question I asked: Is there anything you would like to say to the permafrost young researchers community? Overduin’s answer is short but holistic: “Commit to optimism”. Whether the relevance of our own projects or the outcomes of a global gathering of giants such as COP26, commitment to optimism is the only thing that will fuel faith. And for we believe we can, we will be able to do it.”

Support for national representatives of PYRN

By Filip Hrbacek

PYRN excom will continue with the funding support of your activities. We should be able to offer you up to 300 EUR/year for activities like workshops or meetings organized in your country or in the frame of multiple countries. The funding application form and process remains the same as in the previous years, and you can find it here: <https://pyrn.arcticportal.org/national-representatives/funding-application-form>.

Feel free to contact us by mail: pyrn.nr@gmail.com for any questions.

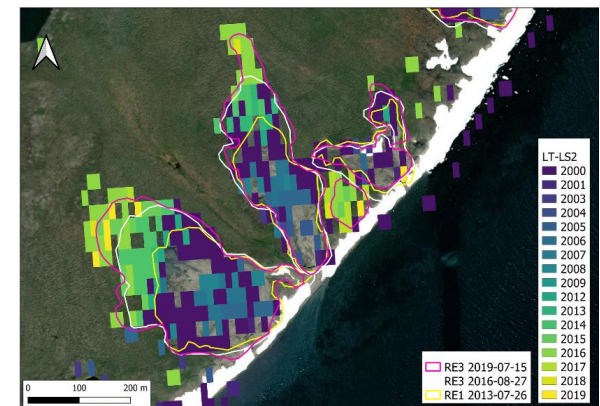
Hot and cool permafrost papers

By Vasily Tolmanov

Remote sensing annual dynamics of rapid permafrost thaw disturbances with LandTrendr

A. Runge, I. Nitze, G. Grosse

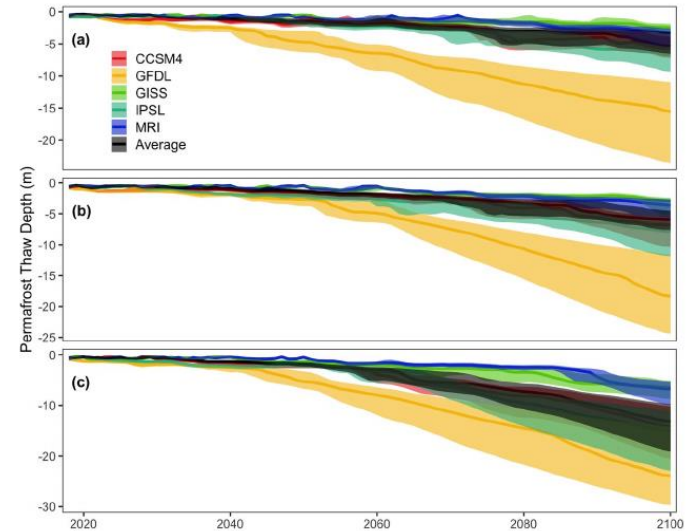
In this study researchers from the AWI (Alfred Wegener Institute) and Institute of Geosciences, Potsdam applied the disturbance detection algorithm LandTrendr for automated large-scale RTS mapping and high temporal thaw dynamic assessment to North Siberia ($8.1 \times 10^6 \text{ km}^2$). Paper was published in the Remote Sensing of Environment journal. Their study presents the first automated detection and assessment of Retrogressive Thaw Slumps (RTS) and their temporal dynamics at large-scale for 2001–2019. Authors identified 50,895 RTS and a steady increase in RTS-affected area from 2001 to 2019 across North Siberia, with a more abrupt increase from 2016 onward. Overall the RTS-affected area increased by 331% compared to 2000 (2000: 20,158ha, 2001–2019: 66,699ha). The detected increase in RTS dynamics suggests advancing permafrost thaw and underlines the importance of assessing abrupt permafrost disturbances with high spatial and temporal resolution at large-scales. Obtaining such consistent disturbance products will help to parametrise regional and global climate change models.



Projecting Permafrost Thaw of Sub-Arctic Tundra With a Thermodynamic Model Calibrated to Site Measurements

A. Garnello, S. Marchenko, D. Nicolsky, V. Romanovsky, J. Ledman, G. Celis, C. Schädel, Y. Luo, E. A. Schuur

This paper published in journal **JGR biogeosciences** is a result of the continued experiments from the UAF scientists and their colleagues. In order to project permafrost thaw for an Alaskan tundra experimental site, authors used seven years of site data to calibrate a soil thermodynamic model using a data assimilation technique. The model reproduced seasonal and interannual temperature dynamics for shallow (5–40 cm) and deep soil layers (2–4 m), and simulations of seasonal thaw depth closely matched observed data. The model was then used to project permafrost thaw at the site to the year 2100 using climate forcing data for three future climate scenarios (RCP 4.5, 6.0, and 8.5). Minimal permafrost thawing occurred until mean annual air temperatures rose above the freezing point, after which they measured over a 1 m increase in thaw depth for every 1 °C rise in mean annual air temperature. Under no projected warming scenario was permafrost remaining in the upper 3 m of soil by 2100. Authors demonstrated an effective data assimilation method that optimizes parameterization of a soil thermodynamic model. The sensitivity of local permafrost to climate warming illustrates the vulnerability of sub-Arctic tundra ecosystems to significant and rapid soil thawing.



PYRN members in #APermafrostPaperAMonth

By Juditha Aga

If you want your paper to be promoted at our social media channels under #APermafrostPaperAMonth, you can contact our social media coordinator Vasily Tolmanov and we would be happy to support your work (vasiliytolmanov@gmail.com). Watch out for the next featured paper!

PhD positions

PhD student on "Natural geologic emissions of methane"

One of the available projects focuses on improved quantification of natural geologic emissions of methane. This project would involve fieldwork in several hydrocarbon basins in the western US and extensive analysis of new and prior data to provide more accurate estimates of geologic methane emissions. This project is collaborative between the research groups of Profs. Vas Petrenko and Thomas Weber

Contact: **Vas Petrenko** (vasilii.petrenko@rochester.edu)

Link: <https://findajob.agu.org/job/8017239/phd-student/>

NERC DTP PhD scholarship opportunity in Geography

Funding as part of a [NERC DTP](#) for one scholarship in the Department of Geography, University of Sheffield, for Oct 2022 start. Of the three Geography projects that are part of this competition, two are cryosphere-relevant:

- Is Greenland greening? Biogeomorphic interactions in the ice sheet forelands (primary supervisor, Stephen Livingstone)
- Dynamics of 'Glacier Blood' microbial ecosystems in the European Alps (primary supervisor, Darrel Swift)

Deadline: **14 January 2022**

Link: <https://www.findaphd.com/phds/project/acce-dtp-fully-funded-studentship-is-greenland-greening-biogeomorphic-interactions-in-the-ice-sheet-forelands/?p136731>

<https://www.findaphd.com/phds/project/acce-dtp-fully-funded-studentship-dynamics-of-glacier-blood-microbial-ecosystems-in-the-european-alps/?p136583>

Postdoc positions and others

Several Postdocs - Machine Learning in Science

The University of Tübingen (Germany) cluster of excellence in machine learning is offering several postdoctoral fellowship positions to bridge between the natural and computer sciences. There is particular interest in persons who can link to the geo-, bio- and computer sciences (amongst other things).

Deadline: **15 December 2021**

Contact: **Central Office of the Cluster of Excellence** (ml-in-science@uni-tuebingen.de)

Link: https://www.apecs.is/images/Articles/Files/2021_ExC_ML_PostdocCall_Final.pdf

Postdoc position in earth system modeling

The University of Utrecht is looking for an Earth System modeler. You are expected to work with CESM2, in order to improve our understanding of (very) long-term changes of the cryosphere in the Arctic and Antarctic regions.

Deadline: **18 December 2021**

Contact: **Dr. W.J. (Willem Jan) van de Berg** (w.j.vandenberg@uu.nl)

Link: <https://www.uu.nl/en/organisation/working-at-utrecht-university/jobs/postdoc-position-in-earth-system-modelling-08-10-fte>

Postdoc position in polar climate modeling and remote sensing

The University of Utrecht is looking for you if you are experienced in combining **geophysical modeling with remote sensing**. For this position, you are expected to work on the Antarctic firn layer, surface melt, and firn hydrology. You will also be responsible for developing and publishing up-to-date firn data products for Antarctica, using our firn model IMAU-FDM.

Deadline: **18 December 2021**

Contact: **Dr. P. (Peter) Kuipers Munneke** (p.kuipersmunneke@uu.nl)

Link: <https://www.uu.nl/en/organisation/working-at-utrecht-university/jobs/postdoc-position-in-polar-climate-modelling-and-remote-sensing-08-10-fte>

Postdoctoral Research Fellow in Global Arctic Studies

The University of Tromsø is looking for a postdoc to do Arctic International Relations research with a focus on the Circumpolar Arctic. Areas of research can be the Arctic in international political, economic, technological and security systems; science, technology and international politics in the Arctic; science diplomacy; world order and Arctic order. Other approaches to Global Arctic Studies are welcome. Interdisciplinary proposals are encouraged.

Deadline: **19 December 2021**

Contact: **Hans-Kristian Hernes** (hans-kristian.hernes@uit.no)

Link: <https://www.jobbnorge.no/en/available-jobs/job/214868/postdoctoral-research-fellow-in-global-arctic-studies>

Postdoc in biosphere-atmosphere fluxes of methane in permafrost environments

The Cooperative Institute for Research in Environmental Sciences (CIRES) in Boulder, Colorado is encouraging applications for a Postdoctoral Associate. The successful candidate will work with developers of a new laser methane sensor to develop and implement biosphere-atmosphere permafrost methane flux modeling using measurements in the arctic.

Contact: **Caroline Alden** (caroline.alden@noaa.gov)

Link: <https://jobs.colorado.edu/jobs/JobDetail/CIRES-Post-Doctoral-Associate/34564>

Assistant Professor (Tenure Track) in high-latitude hydrology / biogeochemistry

Deadline: **December 15, 2021**

Contact: **Associate Professor J. E. Vonk** (j.e.vonk@vu.nl)

Link: <https://werkenbij.vu.nl/ad/assistant-professor-tenure-track-in-high-latitude-hydrology-biogeochemistry-0/p2ax4e>

Several positions at Woodwell Climate Research Center

Including: Arctic Research Scientist, Arctic Postdoctoral Researcher, Postdoctoral Researcher in Arctic Fire Modeling, Postdoctoral Researcher in Boreal Fire Mapping, Research Assistant in Soil Carbon Monitoring

Deadline: **Various, check specific job advert**

Contact: **Career Portal on website**

Link: <https://www.woodwellclimate.org/careers/>

Upcoming Dates



By Juditha Aga

AGU Fall Meeting 2021

December 13-17, 2021. New Orleans, USA & online. <https://www.agu.org/Fall-Meeting>

ArcticNet Annual Scientific Meeting

December 6-10, 2021. online. <https://arcticnet.swoogo.com/2021/1188342?lang=en>

International Geomorphology Week 2022

February 28 - March 4, 2022. online. [International Geomorphology Week 2022 - IAG - International Association of Geomorphologists](https://www.igw2022.org/)

EGU General Assembly 2022

April 3-8, 2022. Vienna, Austria. <https://www.egu22.eu/>

Stay up to date with PYRN social media

By Vasily Tolmanov

We started the Permafrost alphabet - an educational-entertaining project in social media. You can see the examples of the posts in the subsequent text. You can take part in the creation of the "letter". If you have ideas or desire to help - please, contact me using one of our social networks.



Just a reminder that **PYRN** is active in a variety of social media channels! Follow us now!

We use platforms like **Twitter**, **Facebook**, **Instagram** and **LinkedIn** to communicate news about PYRN, articles, information on events and photos.



*Be part of the PYRN social media community and reach out to hundreds of permafrost enthusiasts! Use the tag **@pyrn_official** and hashtag **#pyrn** on Twitter, Facebook and Instagram to share your updates or pictures via the **'PYRN'** account.*

This Newsletter was prepared by PYRN ExCom 2020-2021 team

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