



# Community *MEMBER PROFILE*

**Dr. Åsa Rennermalm**

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*AREAS OF EXPERTISE: PHYSICAL GEOGRAPHER, SPECIALIZING IN CLIMATE CHANGE,  
HYDROLOGY, AND GLACIOLOGY OF THE POLAR REGIONS*







## WHAT DO YOU STUDY?

I am a physical geographer, specializing in climate change, hydrology, and glaciology of the polar regions. I am currently studying how water is transported and retained within the Greenland ice sheet to better understand how much meltwater escapes to the ocean, and rising sea levels. This involves modeling, satellite and data analysis, and fieldwork. In one of my projects, we have been collecting shallow cores on the ice sheet in what is called the ice sheet's accumulation zone, where snow accumulates faster than it melts, to look at firn. That's the porous layer of previous winters' snow between the top layer of snow and the compacted glacial ice at the base, which is not porous. Firn typically absorbs a substantial amount of the meltwater of the Greenland ice sheet each summer. But since 2012 scientists have found meters-thick layers of ice within the firn layer, especially at the ice sheet's lower elevations. They have seen streams forming on top of the ice sheet because the firn has been unable to absorb the increased amounts of meltwater that we've been seeing in response to a warmer climate. In addition to studying firn cores, my group and I also study meltwater flow in streams on the tundra and on the ice sheet ablation zone (where it melts faster than snow accumulates). Here we measure stream discharge and map out the stream network and look at process by which Greenland is losing ice to the ocean as that meltwater runs off.

## WHAT EXCITES YOU ABOUT THIS WORK?

The Arctic landscapes fascinate me, especially on the ice sheet — the brilliant blue of the stream network. I also have conducted fieldwork near the DYE-2 site that was part of the US's Cold War defense monitoring system [which closed in 1988 and has since been abandoned]. It is surreal to see this six-story structure with a huge white dome in the middle of the ice sheet.

I've been interested in the Arctic for all of my career. The first time I went was in 1995 as an undergraduate at the University of Copenhagen. We went to the Russell Glacier outside of Kangerlussuaq [one of the outlet glaciers of the Greenland ice sheet]. And then I've been there almost every year since 2008. Early on, I shifted my focus to studying processes related to climate change, but I didn't think I would witness the impact in my lifetime. But over the last decade every year the glacier is visibly thinning; ice is disappearing and the bedrock is coming out. I can also see the numbers and I know the ice sheet is losing mass.



## WHAT ELSE WOULD YOU LIKE TO WORK ON?

I'm part of a new international collaborative of 20 scholars from Arctic countries, including Canada, Iceland, and Scandinavia. I am one of two physical scientists; others include scholars with expertise in law, social science, economics, politics, and public health experts. I'm working on Arctic resources and climate change. The goal is to combine our various perspectives to come up with some policy recommendations. I've done a lot of discovery science but this new work is more solution based and focused on direct connection to the societal here-and-now to try to generate science useful for policy makers. I've done collaborations with natural scientists before, but not social scientists, so this is very exciting for me. I am going to spend September through November in Nuuk, Greenland, making connections related to this project.

I'm also starting a new collaboration with the computer science department at Rutgers for methods of mapping surface streams with AI.

## WHEN YOU AREN'T DOING ARCTIC RESEARCH, WHERE MIGHT WE FIND YOU?

New Jersey, mostly! I love being active, kayaking and being out in nature. Despite what you might think about New Jersey, head southeast or northwest and there are amazing places. I also like living here because there is a lot of music and art to enjoy, and also New York City is close by with infinite exciting opportunities.





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