Kristin Poinar

kpoinar@buffalo.edu
(301) 614-7041
science.gsfc.nasa.gov/sed/bio/kristin.poinar

University at Buffalo
Department of Geology
Research and Education in eNergy, Environment, and Water (RENEW) Institute

Education

Ph.D. in Geophysics
University of Washington, Seattle — *December 2015*
Thesis: "The influence of meltwater on the thermal structure and flow of the Greenland Ice Sheet"
Advisor: Ian Joughin

Graduate Certificate in Climate Science
University of Washington Program on Climate Change — *October 2015*
Capstone: "Climate change, place-based geology, and restoration along the Burke-Gilman Trail"
Advisor: Luann Thompson

B.S. in Physics
Case Western Reserve University, Cleveland, OH — *May 2007*

B.A. in English
Case Western Reserve University, Cleveland, OH — *May 2007*

Professional Experience

Assistant Professor — University at Buffalo
Department of Geology and RENEW Institute — *to begin January 2018*

NASA Postdoctoral Fellow — NASA Goddard Space Flight Center
Postdoctoral research on Greenland Ice Sheet flow dynamics — *January 2016 – December 2017*
Advisor: Sophie Nowicki

Research Assistant — Univ. Washington
Numerical modeling of Greenland Ice Sheet thermodynamics and hydrology — *2007–2015*

Co-Instructor — Colorado College
EV 128, Introduction to Global Climate Change — *Winter 2014*
Faculty Co-Instructor: Miro Kummel

Research Interests

Glaciology (especially Greenland)

Surface hydrology: How does the ice-sheet surface interact with meltwater?
(supraglacial rivers, supraglacial lakes, cryoconite holes, crevasses as radiation traps)

Englacial hydrology: What pathways does water take through a glacier? How have these pathways changed in the past few decades?
(firn aquifers, moulins, crevasses, incised channels, percolation and refreezing in snow and firn)

Subglacial hydrology: How does water at the base of the ice sheet organize itself?

Ice sheet thermodynamics: How does ice temperature affect ice flow?

Glacier shear margins: What do sharp spatial transitions in ice flow mean for ice dynamics?

Climate change: How will these processes change in future climates, and what does that mean for global sea levels?

Earth and climate systems

How have ice-sheet processes affected ice-sheet size during past climate swings?

How do ice sheets and glaciers interact with their surroundings? (sediment plumes, coastal sea ice, ice-shelf-bottom crevasses, geothermal flux anomalies)

Valley glaciers as analogues for ice sheets

Numerical methods (I'm always interested in making model codes run faster)

Publications

These and other (non-refereed) publications are also listed on my Google Scholar and Research Gate pages.

K. Poinar, I. Joughin, D. Lilien, L. Brucker, L. Kehrl, and S. Nowicki, 2017. "Drainage of Southeast Greenland Firn-Aquifer Water through Crevasses to the Bed." *Frontiers in Earth Science* special issue "Melt Water Retention Processes in Snow and Firn on Ice Sheets and Glaciers: Observations and Modeling" 5, 8–15. doi:10.3389/feart.2017.00005

K. Poinar, I. Joughin, J. T. M. Lenaerts, and M. R. van den Broeke, 2016. "Englacial Latent-Heat Transfer Has Limited Influence on Seaward Ice Flux in Western Greenland." *Journal of Glaciology* 62(235), 1–16. doi:10.1017/jog2016.103.

D. Shapero, I. Joughin, **K. Poinar**, M. Morlighem, F. Gillet-Chaulet, 2016."Basal Resistance for Three of the Largest Greenland Outlet Glaciers." *Journal of Geophysical Research* 121, 1–13. doi:10.1002/2015JF003643.

K. Poinar, I. Joughin, S. B. Das, M. D. Behn, J. T. M. Lenaerts, and M. R. van den Broeke, 2015. "Limits to Future Expansion of Surface-Melt-Enhanced Ice Flow Into the Interior of Western Greenland." *Geophysical Research Letters* 42(6), 1800–1807. doi:10.1002/2015GL063192.

R. Schnee, Z. Ahmed, S. Golwala, D. Grant, and **K. Poinar**, 2007. "Screening Surface Contamination with BetaCage." *American Inst. of Physics Conf. Procs.* 897(20). doi:10.1063/1.2722063.

Funding

NASA Postdoctoral Fellowship — NASA Postdoctoral Program (NPP)
Two-year research fellowship — *January 2016–present*
~$200,000 over two years

Graduate Research Fellowship — National Science Foundation
Only 913 awards made; compare to >2000 currently — *2008–2011*
~$180,000 over three years

Program on Climate Change Graduate Fellowship — University of Washington
~$50,000 over one academic year — *2007–2008*

Support of Undergraduate Research and Creative Endeavors (SOURCE) award — Case Western Reserve University
2006
~$3,000 over a summer; internal funding designated for undergraduate research and supplies

Media

TED talk: "Hidden Changes in the Greenland Ice Sheet" — TED2017, Vancouver
Invited speaker in the "Planet, Protection" session — *April 2017*

Led post-film discussions for *Chasing Ice* — Washington State History Museum
"The Science Behind Chasing Ice" — *September 2013*

Seattle Independent Film Festival
May 2012

Research featured in *New Scientist* magazine "Greenland poised on a knife edge"
Based on work presented at the AGU Fall Meeting *January 8, 2011 issue*

Honors

Best Presentation UW Earth and Space Sciences
ESS Gala department research showcase *April 2015*

Best Presentation in Surface Processes or Glaciology UW Earth and Space Sciences
ESS Gala department research showcase *2010, 2011, 2012, 2013, 2014*

GIS Poster Competition Winner University of Washington
UW GIS Day *November 2011*

Elmer C. Stewart Memorial Award (shared) CWRU Department of Physics
Awarded to an outstanding undergraduate in experimental physics *May 2007*

Krumhansl Prize CWRU Department of Physics
Awarded to an outstanding undergraduate woman in physics *May 2007*

Holden Prize (shared) CWRU Department of English
Best undergraduate essay: Using Language to Transcend Language *April 2007*

Research Experience

Postdoctoral Research NASA Goddard
Solved a novel englacial hydrology problem using NASA altimetry data and a custom model to determine that firn-aquifer water can drive a crevasse to the base of the ice sheet in Southeast Greenland *2016–present*

Analyzed potential controls on the seasonal timing of meltwater arrival at the ice-sheet base in Western Greenland using strain rates derived from new remote sensing products

Designed and analyzed scenarios for a subglacial hydrology model to understand the influence of higher-elevation meltwater on ice dynamics

PhD Research Univ. Washington
Developed MATLAB-based thermal ice sheet model with multi-phase physics *2007–2015*
Developed thermo-visco-elastic fracture model for water-filled crevasses

Field Campaigns
Active-source seismology on West Antarctic Ice Sheet *2009–2010*
GPS and field mapping of supraglacial hydrology on the Greenland Ice Sheet *2008–2010*
GPS mapping of glacier surface elevation in Olympic National Park *2010–2011*
Seismometer deployment on Olympic Peninsula and Mount Rainier *2007–2011*

Undergraduate Research CWRU Physics Dept.
Modeled, designed, and commissioned a multi-wire proportional chamber to screen sensitive dark-matter detectors for ultra-low levels of radioactive contamination *2006–2007*

Measured mineral contents and conducted Fourier analysis of a magnetic susceptibility signal in lake sediment cores CWRU Geology Dept. *Summer 2006*

Selected Conference Presentations

K. Poinar, I. R. Joughin, D. Lilien, L. Brucker, L. Kehrl, and S. Nowicki. "Challenges in understanding and predicting Greenland lake drainage events". AGU Fall Meeting, San Francisco. (December 2017).

L. C. Andrews, C. F. Dow, **K. Poinar**, and S. Nowicki. "Subglacial efficiency and storage modified by the temporal pattern of high-elevation meltwater input ". AGU Fall Meeting, San Francisco. (December 2017).

C. F. Dow, **K. Poinar**, L. C. Andrews, and S. Nowicki. "Greenland?s slippery slope: Examining subglacial hydrology development driven by high-elevation melt input variability". NSF Greenland stability workshop, Buffalo NY. (September 2017).

K. Poinar, L. C. Andrews, V. Chu, T. Moon, and S. Nowicki. "Temporal evolution of strain rates at western Greenland moulins". European Geosciences Assembly (EGU), Vienna. (April 2017).

L. C. Andrews, **K. Poinar**, and T. Neumann. "Using remotely sensed ice velocities to constrain regional changes in summer ice motion in Western Greenland". European Geosciences Assembly (EGU), Vienna. (April 2017).

K. Poinar, I. R. Joughin, D. Lilien, L. Brucker, L. Kehrl, and S. Nowicki. "Evolution of crevasses fed by water from the East Greenland firn aquifer." AGU Fall Meeting, San Francisco. (December 2016)

K. Poinar, S. Nowicki, I. R. Joughin, D. Lilien, L. Brucker, M. Studinger, and L. Kehrl. "Englacial penetration of Greenland firn-aquifer water into crevasses." Goddard Young Scientists' Forum, Greenbelt, MD. (October 2016)

K. Poinar, I. R. Joughin, C. Miège, L. McNerney, and S. Nowicki. "Model-based constraints on the depths and thermal influence of water-filled crevasses in western and southeastern Greenland." Workshop on observing and modelling meltwater retention processes in snow and firn on ice sheets and glaciers, Copenhagen. (June 2016)

V. W. Chu, L. C. Smith, C. J. Gleason, K. Yang, **K. Poinar**, I. R. Joughin, and L. H. Pitcher. "Moulin distribution and formation on the southwest Greenland ice sheet." AGU Fall Meeting, San Francisco. (December 2015)

K. Poinar and I. R. Joughin. "Supraglacial lakes, rivers, and moulins in western Greenland." Northwest Glaciologists Meeting, Portland. (October 2015)

K. Poinar and I. R. Joughin. "The contribution of englacial latent heat transfer to seaward ice flux in western Greenland." AGU Fall Meeting, San Francisco. (December 2014)

D. Shapero, I. R. Joughin, **K. Poinar**, and M. Morlighem. "Inferring basal stress under Greenland's big three outlet glaciers." AGU Fall Meeting, San Francisco. (December 2014)

K. Poinar. Department seminar: "Destabilization mechanisms of the Greenland Ice Sheet and why it is likely to slowly melt in place instead." Dept. of Geological Sciences, Case Western Reserve University, Cleveland. (October 2014)

K. Poinar and I. R. Joughin. "Elevation limits to supraglacial lake drainage in western Greenland." IGS Symposium on the Contribution of Glaciers and Ice Sheets to Sea-Level Change, Chamonix, France. (May 2014)

K. Poinar and I. R. Joughin. "How deep does a typical crevasse in Western Greenland carry meltwater?" International Arctic Science Committee (IASC) Network on Arctic Glaciology (NAG) Workshop on the dynamics and mass budget of Arctic glaciers, Ottawa, Canada. (February 2014)

K. Poinar and I. R. Joughin. "How deep does a typical crevasse in Western Greenland carry meltwater?" AGU Fall Meeting, San Francisco. (December 2013)

K. Poinar and I. R. Joughin. "How deep do crevasses carry meltwater in Greenland?" Northwest Glaciologists Meeting, Vancouver. (October 2013)

K. Poinar and I. R. Joughin. "The depth and distribution of crevasses' thermal influence in Western Greenland." AGU Fall Meeting, San Francisco. (December 2012)

K. Poinar and I. R. Joughin. "Thermal signatures of crevasse-based cryo-hydrologic warming in western Greenland." Northwest Glaciologists Meeting, Seattle. (October 2012)

K. Poinar and I. R. Joughin. "Does softening of the margins influence the speed of of Jakobshavn Isbræ, Greenland?" AGU Fall Meeting, San Francisco. (December 2011)

K. Poinar. "Crevasses' effect on the albedo of the Greenland ice sheet." Graduate Climate Conference, Woods Hole, MA. (October 2011)

K. Poinar and I. R. Joughin. "Temperate ice under Jakobshavn Isbræ and other Greenland glaciers." AGU Fall Meeting, San Francisco. (December 2010)

K. Poinar and I. R. Joughin. "The Likelihood of Sudden Sea Level Rise from Greenland." Program on Climate Change Summer Institute: Climate Change Impacts on the Pacific Northwest. Friday Harbor, WA. (September 2010)

R.W. Schnee, Z. Ahmed, S.R. Golwala, D.R. Grant, and **K. Poinar**. "Screening Surface Contamination with BetaCage." Topical Workshop on Low Radioactivity Techniques, Aussois, France. (2006)

K. Poinar, D. S. Akerib, D. R. Grant, R. W. Schnee, T. Shutt, S. R. Golwala, Z. Ahmed. "The Beta Cage: Screening Low Radioactive Backgrounds." Division of Nuclear Physics Annual Meeting, Nashville. (2006)

Workshops and Summer Schools

How Stable is the Greenland Ice Sheet? — University at Buffalo
NSF workshop on the past and present extent and dynamics of Greenland — *September 2017*

Kananaskis Short Course on Principles of Hydrology — Kananaskis, Alberta
Two-week field course on physical principals of cold-regions hydrology — *January 2017*

ISMIP6 Workshop — NASA GSFC
Planning for an Ice Sheet Model Intercomparison Project (ISMIP) for CMIP6 — *July 2014*

Ice Sheet Models for the Twenty-First Century — Portland State Univ.
Two-week school for ice sheet modeling — *July 2009*

Ice Sheets and Glaciers in the Climate System — Karthaus, Italy
Glaciology summer school of Johannes Oerlemans — *September 2008*

Teaching and Mentoring

This section lists post-secondary teaching. Experience with younger students is in "Service and Outreach".

Guest Lecturer for Principles of Glaciology — UW ESS 431/505
Developed lesson on synthesizing the IPCC reports — *2013–2015*

Guest Lecturer for Sustainability Class — Seattle University
Developed a two-day lesson and lab on climate change and glacier response — *October 2013, 2014*

Co-Instructor Colorado College
One block (4 week) course: EV 128, Introduction to Global Climate Change *Winter 2014*

Teaching Assistant UW ESS 431/505
Designed and delivered lectures, graded student work, led discussion sessions *Fall 2012*

Undergraduate Research Experience Graduate Mentor UW / CReSIS
Elizabeth City State University Undergraduate Research Experience *Summer 2011*
"Do strain rates determine the spatial density of crevasses on the Greenland ice sheet?"
GIS / spectral analysis project by Brandon Jamar Scott, undergraduate at St. Augustine College

Service and Outreach

Laboratory and Remote Sensing Exercise Seattle Academy High School
Analysis of LiDAR topography data and glacier flow experiment *2014–2015*

Observing for Evidence of Learning Center for Inquiry Science
Content expert at workshop to redevelop a middle school science lesson *December 2014*

Climate and Earth System Science Labs UW in the High School
Visualizing our past climate using high-resolution geospatial data *October 2014*

Classroom Lesson and Laboratory Einstein Middle School, Shoreline, WA
Glacier flow and erosion *2013–2014*

Classroom Lessons and Field Trip Northeast Seattle elementary schools
Past, present, and future climate of Puget Sound *2013–2014*

Cryosphere Career Development Mentor Panel AGU Fall Meeting
Organized a discussion and networking event for early-career polar scientists *December 2013*

Public Lecture Friends of the Burke Gilman Trail
A Recent History of Ice in Greenland and Antarctica *October 2013*

AmeriCorps Environmental Education Cleveland, Ohio
Taught environmental science to disadvantaged youth and high school students *Summer 2005*

Selected Graduate Coursework

Mathematics and Modeling

- High Performance Scientific Computing (AMATH 583)
- Objective Analysis (ATMS 552)
- Scientific Computing (AMATH 581)
- Methods for Partial Differential Equations (AMATH 403)
- Heat and Mass Flow Modeling (ESS 524)
- Spectral Methods (AMATH 571)

Climate Science

- Carbon and Climate (OCEAN 588)
- Physics of Ocean Circulation (OCEAN 510)
- Ice and Climate (ATMS 514)
- Ice Dynamics (ESS 533)
- Geophysical Fluids (ESS 514)

Climate Dynamics (ATMS 587, Fall 2008)

Geology

The Solid Earth (ESS 502)

Geophysical Inverse Theory (ESS 523)

Continuum Mechanics (ESS 511)

Communication

Writing About Science and Technology for General Audiences (OCEAN 506)

Affiliations

American Association for the Advancement of Science (AAAS)

American Geophysical Union (AGU)

Association of Polar Early-Career Scientists (APECS)

Earth Science Women's Network (ESWN)

Interagency Arctic Research Policy Committee (IARPC)

International Glaciological Society (IGS)

USA Ultimate (USAU)