Nicole E. Spaulding

University of Maine Climate Change Institute
5764 Saywer ERC (Rm 204), Orono, ME 04469
tel: 802-598-4428; e-mail: nicole.spaulding@maine.edu

Education

University of Maine, Orono, Maine, USA — May 2013
Ph.D. Earth and Climate Sciences

University of Maine, Orono, Maine, USA — August 2009
M.S. Quaternary and Climate Studies

Colgate University, Hamilton, New York, USA — May 2006
B.S. Geology

Professional Experience

University of Maine/Harvard University
Research Assistant Professor — January 2016 - present

University of Maine/Harvard University
Postdoctoral Associate — Fall 2013 - December 2015

Conducting an ultra high-resolution investigation of climate signals in an ice core collected at the Colle Gnifetti glacier saddle of the Swiss-Italian Alps. These data will be used to BETTER UNDERSTAND HUMAN-CLIMATE INTERACTIONS in Medieval Europe via a collaboration with historians at Harvard University.
Project PIs: Paul Mayewski (UMaine) and Michael McCormick (Harvard University).

University of Maine
Research Assistant - NSF ANT 0838843 — 2009 - 2013

Investigated the glacial archive of the Allan Hills blue ice area, Antarctica, via the collection, preparation and analysis of isotopic, chemical, global positioning system and ground penetrating radar data. The goal of this project was to DISCOVER THE OLDEST ICE ON EARTH.
Project PIs: Andrei Kurbatov and Paul Mayewski (UMaine) with Michael Bender (Princeton University).

Research Assistant - NSF ANT 0538494 — 2006-2009

Used a scanning electron microscope at Dartmouth College to observe the physical and chemical properties of Antarctic ice cores with the goal of developing more accurate methods of ice core characterization and PROVIDING BETTER PARAMETERIZATION FOR SATELLITE INVESTIGATIONS OF ANTARCTICA.
Project PIs: Debra Meese and Paul Mayewski (UMaine) with Ian Baker (Dartmouth College).

Department of Geology, Colgate University
Research Assistant - NSF AES 0338163 — 2005-2006

Preparation and analysis of diatoms slides from sediment collected within the embayment created by the collapse of the Larsen B ice shelf, Antarctica. The goal of this project, which was part of the larger LARISSA project, was to determine its history of collapse.
Project PI: Amy Leventer

US Army Cold Regions Research and Engineering Laboratory
Student Assistant (GS-1) → Laboratory Technician (GS-5) — Summers 2001-2005

Assistance with various projects supporting both military (evaluation of previously prescribed methods of analyte extraction from explosive contaminated soils) and civilian (ice thin-section photography and grain size analysis) research commitments.

Field/Logistic Experience

Allan Hills Blue Ice Area, Antarctica - 2016: Field team leader (PI) of four person crew during two week ground penetrating radar campaign.

Colle Gnifetti Glacier, Swiss-Italian Alps - 2013: Seven days at 4450m asl. Seven person crew. Responsible for ice core handling in non-ideal weather conditions and preparing gear for helicopter transport.

Allan Hills Blue Ice Area, Antarctica - 2009, 2010: >60 days over two austral summers. Five person crew. Responsible for ground penetrating radar and GPS surveys, meteorite collection, gear selection prior to deployment, daily check-ins with McMurdo via Ham radio, weather observations, and coordination of fixed-wing flights.

US ITASE Traverse, Antarctica - 2008: 60 continuous days in the field on a 1000 km traverse from Taylor Dome to South Pole. 12 person crew. Responsible for logging ice core visual stratigraphy, making fixed-wing weather observations and driving a Caterpillar Challenger 55 tractor pulling supplies and an outhouse.

Larsen Ice Shelf, Antarctica - 2006: $\sim$ 30 day journey onboard *R.V. Nathaniel B. Palmer* from Punta Arenas, Chile across the Drake Passage. Responsible for processing bathymetric data and collecting and sampling sediment cores.

Teaching, Mentoring, and Supervision

University of Maine

Course Instructor/Designer: Fall 2014, 2015

Understanding and Communicating Climate Risk (INT 500, 3cr)

I am responsible for determining course content, designing assignments, and assessing student learning. Example topics include: the role of mental models in risk communication, how an individual's values impact their treatment of the environment, how limited personal experience can lead to contrarianism, and the intricacies of stakeholder engagement.

Guest Lecturer: SUNY Fredonia BIO 450: Global Change Biology February 2015

Supervisor to a group of 8 graduate students 2013

In an effort to improve laboratory workflow and ensure the success of future students, current students redesigned lab spaces and re-wrote laboratory protocols. I facilitated their meetings, evaluated their contributions and lobbied for the funding necessary to implement their vision.

Mentor to one undergraduate student 2011

As a capstone project Ashley Suitter created a podcast, titled "Societal Implications of Industrial Emissions Preserved in Global Ice Archives", explaining how heavy metals, whose atmospheric presence is recorded in ice cores, impact human health. I was responsible for helping her to locate relevant materials and to translate those findings so they were accessible to a broad audience.

Laboratory Supervisor to 2 students (one high school, 1 undergraduate) 2011

These students worked in a -20C freezer and in the lab processing samples that were critical to my dissertation. Ensuring they understood not only the procedure, but the purpose of their work dictated my supervisory style.

Guest Lecturer: ANT 490 Climate and Culture 2011

Presented a lecture on the misuse of scientific literature at the heart of some climate skepticism.

Mentor to one undergraduate student 2010

As a capstone project Eileen Carr created a series of activities that puts real ice core data sets into the hands of teachers, students, and the greater public. I was responsible for monitoring her progress and improving her understanding of how trace metal analysis of ice cores can demonstrate human-climate interactions.

Colgate University

Teaching Assistant Geology 101: Environmental Geology 2004

Community Outreach

K-12 STEM Educators

American Chemical Society Educator Workshop on Climate Change October 2015

Gave plenary talks about the scientific basis for climate change and provided input on the structure of the workshop. Workshop organized by the Maine Local Section of ACS and held at the University of Maine (10/3/15) and Unity College (10/10/15).

University of Maine Climate Science Teacher Workshop June 26, 2015

Participated as a climate expert available to help facilitate planned activities involving Climate Reanalyzer, an intuitive platform for visualizing a variety of weather and climate datasets and models. Workshop organized by Bjorn Grigholm and Amy Kireta.

RiSE Center Summer Academy June 2014

As part of an ongoing collaboration, I assisted in the design and implementation of professional development activities (related to local and global climate change) for 9th grade educators within the University of Maine Research in STEM Education Physical Sciences Partnership.

K-12 STEM Students

Climate Change Institute Science Day 2008-2014

This program provides student throughout Maine (>100 per year) an opportunity to visit the labs of the Climate Change Institute. From 2008-2013 I served as a tour guide and lead activities related to Antarctic field safety. In 2014, I was responsible for soliciting feedback from past participants and redesigning the format (advertising and content) to ensure student engagement and incorporation of Next Generation Science Standards aligned content.

Penobscot Valley Homeschool Adventurers 4-H Club Science Fair - Cloverbud level judge. May 20, 2014

Presentations at National and International Scientific Meetings

Spaulding, N.E., Bohleber, P., Sneed, S., Mayewski, P.A., McCormick, M., Kurbatov, A., and Wagenbach, D. What's in a signal? Examining ultra-high resolution LA-ICP-MS signals for the reconstruction of European climate. *International Partnerships in Ice Sciences (IPICS) Second Open Conference*, Hobart, Tasmania, March 7-11, 2016.

Spaulding, N.E., Mayewski, P.A., Higgins, J.A., Bender, M.L., Sneed, S.B., Handley, M., Introne, D., and Kurbatov, A.V. Glacial-interglacial variability in paired surface ice and ice core records from the Allan Hills Blue Ice Area, Antarctica (poster). *International Partnerships in Ice Sciences (IPICS) Second Open Conference*, Hobart, Tasmania, March 7-11, 2016.

*Kerch, J., Weikusat, I., Eisen, O., Wagenbach, D., Bohleber, P., and **Spaulding, N.E.** Characterization of cm-scale variations of crystal orientation fabric in a cold Alpine ice core from Colle Gnifetti. *26. Internationale Polartagung*, Munich, Germany, September 7-11, 2015.

Spaulding, N.E., Bohleber, P., Mayewski, P.A., Wagenbach, D., Kurbatov, A., Sneed, S., Handley, M., and Erhardt, T. Refining LA-ICP-MS techniques for the exploration of ultra-thin layers in Alpine and Polar ice (Poster). *European Geophysical Union Congress*, Vienna, Austria, April 12-17, 2015.

*Bohleber, P., **Spaulding, N.E.**, Mayewski, P.A., Sneed, S., Handley, M., Erhardt, T., and Wagenbach, D. Improved stratigraphic dating at a low accumulation Alpine ice core through laser ablation trace element profiling at sub-mm depth resolution. *European Geophysical Union Congress*, Vienna, Austria, April 12-17, 2015.

*Haines, S.A., Mayewski, P.A., Kurbatov, A.V., Sneed, S.B., Maasch, K.A., Dixon, D.A., and **Spaulding, N.E.** Investigation of Greenland and Antarctic ice core recorded abrupt climate change using ultra-high resolution laser sampling (Poster). *SCAR Open Science Conference*, Auckland, New Zealand, August 25-28, 2014.

Spaulding, N.E., Bohleber, P., Sneed, S.B., Wagenback, D., Mayewski, P.A., and McCormick, M. High-resolution laser ablation ICP-MS analysis of a new ice core from Colle Gnifetti. *18th Alpine Glaciology Meeting*, Innsbruck, Austria, February 28, 2014.

*van Wijk, K., Otheim, L.T., Marshall, H.P., and **Spaulding, N.E.** Laser ultrasonic characterization of ice cores (Poster #C13C-0694). *AGU Fall Meeting*, San Francisco, CA, December 2013.

*Higgins, J.A., Chimiak, E., Bender, M.L., Kurbatov, A.V., **Spaulding, N.E.**, Mayewski, P.A., and Brook, E. Ar isotope evidence for ∼1 Myr old ice from shallow cores in the Allan Hills Blue Ice Area, Antarctica (Poster #1820392). *AGU Fall Meeting*, San Francisco, CA, December 2013.

Bohleber, P., **Spaulding, N.E.**, Wagenback, D., Mayewski, P.A., and Sneed, S.B. A new project for high-resolution ice core analysis at Colle Gnifetti, Swiss-Italian Alps in comparison with historical climate records (Poster). *Inaugural Conference of the Initiative for the Science of the Human Past at Harvard*, Cambridge, MA, November 1, 2013.

Spaulding, N.E., Kurbatov, A.V., Higgins, J.A., Mayewski, P.A., Bender, M.L., and Introne, D.S. Insights on WAIS history from a high-resolution Eemian record collected at the Allan Hills Blue Ice Area, Antarctica. *19th Annual WAIS Workshop*, Pack Forest Conference Center, Eatonville, WA, September 19-22, 2012.

Spaulding, N.E., Kurbatov, A.V., Mayewski, P.A., Bender, M.L., Higgins, J.A., and Introne, D.S., Isotopic investigation

of the integrity of environmental records at the Allan Hills Blue Ice Area, Antarctica. *SCAR Open Science Conference*, Portland, OR, July 16-19, 2012.

Spaulding, N.E., Kurbatov, A.V., Mayewski, P.A., Bender, M.L., Higgins, J.A., Spikes, V.B., Introne, D.S., and Sneed, S.B. Exploration and development of the climate archive of the Allan Hills, Antarctica (Poster)†. *INQUA Congress*, Bern, Switzerland, July 21-27, 2011. †Winner City of Bern Poster Award.

Spaulding, N.E., Kurbatov, A.V., Mayewski, P.A., Bender, M.L., Higgins, and J.A. Allan Hills research. *MidWest Glaciological Meeting*, Woods Hole Oceanographic Institute, Woods Hole, MA, April 15 - 16, 2010.

Spaulding, N.E., Meese, D.A., Baker, I., and Mayewski, P.A. Determination of polar firn/ice core physical properties using scanning electron microscopy (Poster). *37th Annual Arctic Workshop*, Skaftafell National Park, Öræfi, Iceland, May 2 - 5, 2007.

* Indicates posters and presentations for which I was a co-author, but not presenter.

Presentations at Local and Regional Scientific Meetings

Spaulding, N.E., Bohleber, P., Sneed, S.B., Wagenback, D., Mayewski, P.A., and McCormick, M. Combining novel ice core analysis with ancient historical records: First results from the Colle Gnifetti ice core project, European Alps. *Harold W Borns Symposium*, Orono, ME, April 17-18, 2014.

Spaulding, N.E., Kurbatov, A.V., Mayewski, P.A., Bender, M.L., and Higgins, J.A. Searching for ancient ice in the Allan Hills: A project synopsis. *Harold W Borns Symposium*, Orono, ME, April 22-23, 2013.

Spaulding, N.E., P.A., Bender, M.L., Higgins, J.A., Introne, D.S., Kurbatov, A.V., and Mayewski, P.A., Paired blue ice surface and ice core environmental records from the Allan Hills Blue Ice Area, Antarctica. *Harold W Borns Symposium*, Orono, ME, April 5-6, 2012.

Spaulding, N.E., Kurbatov, A.V., Spikes, V.B., Hamilton, G.A., and Mayewski, P.A. Mass balance of the Allan Hills Blue Ice Area. *Harold W Borns Symposium*, Orono, ME, April 7 - 8, 2011.

Spaulding, N.E., Kurbatov, A.V., and Mayewski, P.A. 2MBIA09 - Searching for the oldest ice on Earth. *Harold W Borns Symposium*,Orono ,ME, May 6-7, 2010.

Spaulding, N.E., Meese, D.A., Baker, I., and Mayewski, P.A. On the use of scanning electron microscopy to characterize firn/ice cores. *Harold W Borns Symposium*, Orono, ME May 8 - 9, 2008.

Spaulding, N.E., Meese, D.A., Baker, I., and Mayewski, P.A., Firn and ice core close-ups (Poster)†. *Climate Change 21 – Choices for the 21st Century (CC21)*, Orono, ME, October 23-24, 2008. †Poster Competition Honorable Mention

Presentations to the General Public

> 300 learners of all ages

Gateway Seniors Without Walls	April 3, 2014
Women in Science and Technology Forum at White Mountains Community College	May 10, 2013
Encore Leadership Corps	June 17, 2011
Orono High School Lunchtime Lecture Series	May 21, 2010
Bangor High School Astronomy Class	March 12, 2010
Troy Howard Middle School Girls STEM Club	February 25, 2010
Penboscot Bay STEM Collaborative	February 25, 2010

Funded Research Projects

National Science Foundation

PI, PLR-1443461 8/26/15-8/25/16
Collaborative Research: Allan HILLs Englacial Site (AHILLES) Selection. $35,594.

Peer Review Publications

Haines, S.A., Mayewski, P.A., Kurbatov, A.V., Maasch, K.A., Sneed, S.B., **Spaulding, N.E.**, Dixon, D.A., Bohleber, P.D. 2015. Ultra-High Resolution Snapshots of Three Multi-decadal Periods in an Antarctic Ice Core. *Journal of Glaciology*. In Press.

Higgins, J.A., Kurbatov, A.V., **Spaulding, N.E.**, Brook, E.J., Introne, D.S., Chimiak, L.M., Yan, Y., Mayewski, P.A., and Bender, M.L. 2015. Snapshots of atmospheric composition at ∼1 Ma from the Allan Hills, Antarctica. *Proceedings of the National Academy of Sciences*. 112(22), pp 6887-6891.

Sneed, S.B., Mayewski, P.A., Sayre, W.G., Handley, M.J., Kurbatov, A.V., Taylor, K.C., Bohleber, P., Wagenbach, D., Erhardt, T., and **Spaulding, N.E.** *2015*. New LA-ICP-MS cryocell and calibration technique for sub-millimeter analysis of ice cores. *Journal of Glaciology* 61(226), pp 233-242.

Spaulding, N.E., Higgins, J.A., Kurbatov, A.V., Bender, M.L., Arcone, S.A., Campbell, S., Dunbar, N.W., Chimiak, L.M., Introne, D.S., and Mayewski, P.A. 2013. Climate archives from 90-250 ka in horizontal and vertical ice cores from the Allan Hills Blue Ice Area, Antarctica. *Quaternary Research* 80(3), pp 562-574.

Mayewski, P.A., Maasch, K.A., Dixon, D., Sneed, S.B., Oglesby, R., Korotkikh, E., Potocki, M., Grigholm, B., Kreutz, K., Kurbatov, A.V., **Spaulding, N.**, Stagger, J.C., Taylor, K.C., Steig, E.J., White, J., Bertler, N.A.N., Goodwin, I., Simões, J.C., Jaña, R., Kraus, S. and Fastook, J. 2013. West Antarctica's sensitivity to natural and human forced climate change over the Holocene, *Journal of Quaternary Science* 28(1), pp 40-48.

Spaulding, N.E., Spikes, V.B., Hamilton, G.S., Mayewski, P.A., Dunbar, N.W., Harvey, R.P., Schutt, J., Kurbatov, A.V. 2012. Ice motion and mass balance at the Allan Hills Blue Ice Area, Antarctica, with implications for paleoclimate reconstructions, *Journal of Glaciology* 58(208), pp 399-406.

Spaulding, N.E., Meese, D.A., Baker, I. 2011. Advanced microstructural characterization of four east Antarctic firn/ice Cores, *Journal of Glaciology* 57(205), pp 796-810.

Spaulding, N.E., Meese, D.A., Baker, I., Mayewski, P.A., Hamilton, G.S. 2010. A new technique for firn grain-size measurement using SEM image analysis, *Journal of Glaciology* 56(195), pp 12-19.

Other Publications

Spaulding, N.E. 2012. Exploration and Development of the Climate Archive of the Allan Hills, Antarctica, *PhD Dissertation*, University of Maine.

Spaulding, N.E. 2009. Characterization of firn microstructure using scanning electron microscopy: Implications for physical properties measurements and climate reconstructions, *Masters Thesis*, University of Maine.

Spaulding, N.E. 2006. Diatom assemblages of the Larsen Embayment and their use as paleoenvironmental indicators, *Honors Thesis*, Colgate University.

Spaulding, N. 2011. The ultimate classroom: fieldwork at Allan Hills, Antarctica provides lifetime of learning, *In-Depth Newsletter of the National Ice Core Lab Science Management Office* 6(1), pp 2-3.

Grigholm, B., Dixon, D., Korotkikh, E., **Spaulding, N.**, Palacz, A., Potocki, M., Brothers, L., Maasch, K., and Mayewski, P. 2008. *An introduction to global climate change*, University of Maine Climate Change Institute. White Paper.

Media Coverage

UMaine's Laser Ice Lab Sheds Light on Climate Change - *WABI TV5* News Report, Air Date: February 11, 2014.

Out of the Blue - *UMaine Today* Magazine Article, Fall 2010 Issue.

University and Professional Service

Grant Reviewer/Review Panelist: National Science Foundation	2014-present
Manuscript Reviewer: Journal of Glaciology, Langmuir, Nature	2011-present
Judge: Center for Undergraduate Research Poster Competition	2012
Respondent: "Ask at Climatologist" section of the Maine Climate News website	2010
Senator: University of Maine Graduate Student Government	2009-2011

Vice President: Colgate University Geological Society Fall 2005

Technical and Computing Skills

Data Management and Statistical Tools: R, P301dx

Data Visualization and Mapping Tools: Adobe Illustrator, Microsoft Powerpoint, basic HTML, ArcGIS

Document Preparation: LaTeX, Microsoft Word