Nicole E. Spaulding

University of Maine Climate Change Institute
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Education

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

Dissertation Title: *Exploration and Development of the Climate Archive of Allan Hills, Antarctica*

Advisor: Andrei Kurbatov

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

Thesis Title: *Characterization of Firn Microstructure Using Scanning Electron Microscopy: Implications for Physical Properties Measurements and Climate Reconstructions*

Advisor: Debra Meese

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

Honors Thesis Title: *Diatom Assemblages of the Larsen Embayment and Their Use as Paleoenvironmental Indicators*

Advisor: Amy Leventer

Professional Experience

University of Maine Climate Change Institute

Postdoctoral Associate — Fall 2013 - Present

High-resolution investigation of climate signals in an ice core collected at the Colle Gnifetti glacier saddle in the Swiss-Italian Alps in order to ***better understand human-climate interactions*** in Medieval Europe.

Research Assistant - NSF ANT 0838843 — 2009 - 2013

Investigation of the Allan Hills climate archive through collection, preparation and analysis of isotopic, chemical, global positioning system and ground penetrating radar data with the goal of discovering ***the oldest ice on Earth***.

Research Assistant - NSF ANT 0538494 — 2006-2009

Scanning electron microscope observation of the physical and chemical properties of US ITASE ice cores with the goal of developing more accurate methods of ice core characterization and providing ***better parameterization for satellite investigations of Antarctica***.

Department of Geology, Colgate University

Research Assistant — 2005-2006

Preparation and analysis of diatoms slides from sediment within the embayment created by the collapse of the Larsen B ice shelf with the goal (within the larger LARISSA project) of determining its history of collapse.

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.

Teaching and Mentoring Experience

University of Maine

Course Instructor: Graduate Seminar in Quaternary Studies (INT 500, 3cr) — Fall 2014

Course Theme: ***Understanding and Communicating Climate Risk***. Responsible for determining course content, designing assignments, and assessing student learning.

Supervisor to a group of 8 graduate students creating laboratory protocols for CCI 2013 - 2014

In an effort to improve laboratory workflow and ensure the success of future students, current students redesigned lab spaces, streamlined supply ordering and wrote out laboratory protocols.

Mentor to one undergraduate student developing a podcast using ice core data 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. The podcast is available at http://cci.um.maine.edu/2MBIA.

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

The students worked in the freezer and in the lab processing samples that were critical to my dissertation. Ensuring they understood not only the procedure, but the purpose dictated my supervisory style.

Guest Lecturer: ANT 490 Climate and Culture 2011

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

Mentor to one undergraduate student developing an open learning resource 2010

As a capstone project Eileen Carr created a series of activities that puts real-world data sets and models of climate science processes into the hands of teachers, students, and the greater general public. They are available at http://cci.um.maine.edu/2MBIA.

Colgate University

Teaching Assistant Geology 101: Environmental Geology 2004

Responsible for setting up lab materials and guiding students during the lab period.

***Relevant Coursework:**

SED 402 Adapting Instruction for Students with Disabilities; ESC 452 Teaching Science in Secondary Schools

Field Experience

Field Assistant: Colle Gnifetti Glacier, Southern Alps, Switzerland August 2013

Ice core logging, packing, and processing as part of a seven person crew.

Field Associate: Allan Hills Blue Ice Area, Antarctica 2009-2011

Two field seasons collecting ice isotope samples, ground penetrating radar profiles and precision GPS measurements. In camp/logistic responsibilities included daily check-ins, weather observations, coordination of fixed-wing flights and resupply orders.

Field Associate: US ITASE Traverse - Taylor Dome to South Pole, Antarctica November 2007 - January 2008

$>$ 60 continuous days in the field working as an ice core handler/technician logging visual stratigraphy. In camp/logistic responsibilities included fixed-wing weather observations and driving a Caterpillar Challenger 55 hauling supplies and an outhouse.

Field Assistant: Larsen Ice Shelf, Antarctica *onboard R.V. Nathaniel B. Palmer* April - May 2006

Processing and sampling sediment cores, grab samples and water samples.

Science Education/Outreach Activities

RiSE Center Summary Academy June 24-26, 2014

Assisted in the design and implementation of professional development activities (related to local and global climate change) for 9th grade teachers within the PSP EarthComm cohort.

Women in Science and Technology Forum - White Mountains Community College May 10, 2013

Served as a panelist at an event encouraging high school girls in the North Country of NH to pursue STEM careers.

Encore Leadership Corps Summit June 17, 2011

Presentation for EnCorps, a statewide volunteer effort administered by the UMaine Center on Aging.

Climate Change Institute Science Day May 2008, 2009, 2010, 2011, 2012; October 2013

Presentations to $\sim$100 middle and high school students from throughout Maine.

College of the Atlantic - Climate System Dynamics February 18, 2011

Presentation to students during class visit to the Climate Change Institute.

Orono High School Lunch-time Lecture Series May 21, 2010

On being a graduate student and working in Allan Hills, Antarctica.

Bangor High School Astronomy Class March 12, 2010

Meteorites as they relate to the paleoenvironmental record at Allan Hills, Antarctica.

Troy Howard Middle School STEM February 25, 2010

Field work and the Allan Hills Project.

Penboscot Bay STEM Collaborative at the UMaine Hutchinson Center February 25, 2010

The current science of climate change and the importance of an Allan Hills, Antarctica record.

Presentations at National and International Meetings

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*, University of Innsbruck, Innsbruck, Austria, February 28, 2014.

van Wijk, K., Otheim, L.T., Marshall, H.P., Kurbatov, A.V., 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*, Harvard University, 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.

Presentations at Local and Regional 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

Peer Review Publications

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. *In Preparation, July 2014*. Snapshots of atmospheric composition at ∼1 Ma from the Allan Hills, Antarctica.

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. 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.

Baker, I., Sieg, K., **Spaulding, N.**, Meese, D. 2007. Advanced Electron Microscopy Techniques for Studying Ice and Firn Cores, *Proceedings of the 10th International Symposium on Antarctic Earth Sciences*, University of California- Santa Barbara, CA, August 26th-31st.

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.

University and Professional Service

Judge: Center for Undergraduate Research Poster Competition (2012)

Reviewer: Journal of Glaciology (2011-present), Langmuir (2014-present)

Ask a Climatologist Maine Climate News (2010)

Senator: University of Maine Graduate Student Government (2009, 2010)

Vice President: Colgate University Geological Society (Fall 2005)

Technical and Computing Skills

Data Management and Statistical Tools: R, P301dx

Data Visualization and Mapping Tools: Generic Mapping Tools (GMT), Adobe Illustrator, ArcGIS