

Dr. Anna K. Henderson

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CURRENT POSITION

Postdoctoral Fellow, Pennsylvania State University, Department of Geosciences

Research: Investigate Miocene grassland formation with organic geochemistry analysis of biomarkers and vegetation-climate modeling.

Mentor: Dr. Katherine Freeman

EDUCATION

Ph.D. Geology, University of Minnesota, 2010

Thesis: Dual hydrogen and oxygen isotopic approach for tracking seasonal precipitation contributions and evaporative processes in modern systems and in paleoclimate reconstructions

Emphasis: Paleoclimate, vegetation ecology, sedimentology, biomarkers and stable isotopes

Advisor: Dr. Bryan Shuman

B.A. Geology-Biology, Brown University, 2003

Senior Project: Survey of ice margin recession as an indicator of climate change near the ELA of the Llewellyn Glacier, Alaska-Canada 1985-2002

JOURNAL ARTICLES

Henderson, A.K., Shuman, B. N., Huang, Y., Environmental controls on the D/H ratios of behenic and palmitic acid in Rocky Mountain and eastern North American lake sediments. Submitted. *Geochimica et Cosmochimica Acta*.

Shuman, B.N., **Henderson, A.K.**, Plank, C., Moisture patterns in the United States and Canada over the past 15,000 years: a new synthesis of lake shoreline-elevation data. In review, *Quaternary Science Reviews*.

Bartlein, P.J., Harrison, S.P., Brewer, S., Connor, S., Davis B.A.S., Gajewski, K., Guiot, J., Harrison-Prentice, T.I., **Henderson, A.**, Peyron, O., Prentice, I.C., Scholze, M., Seppä, H., Shuman, B., Sugita, S., Thompson, R.S., Viau, A.E., Williams, J., Wu, H., 2011, Pollen-based continental climate reconstructions at 6 and 21 ka: a global synthesis: *Climate Dynamics*, 37 (3), 775 – 802. DOI 10.1007/S00382-010-0904-1.

Henderson, A.K., Nelson, D.M, Hu, F.S., Huang, Y., Shuman, B.N., Williams, J.W., 2010, Holocene climate seasonality captured by a dual-isotope approach at Steel Lake, Minnesota: *Earth and Planetary Science Letters* 300, 205 – 214. DOI 10.1016/j.epsl.2010.09.024.

Henderson, A.K., Shuman, B.N., 2010, Differing controls on lake- and river-water hydrogen and oxygen isotopic values in the western United States: *Hydrological Processes*. DOI 10.1002/hyp.7824.

Shinker, J.J., Shuman, B.N., Minckley, T., **Henderson, A.K.**, 2010, Climatic shifts in the availability of contested waters: A long-term perspective from the headwaters of the North Platte River: *Annals of the Association of American Geographers (Special Issue on Climate Change)*, 100 (4), 1 - 14.

Henderson, A.K. and Shuman, B., 2009, Hydrogen and oxygen isotopic composition of lake-water in the western U.S.: *Geologic Society of America Bulletin* 121, 1179 – 1189. DOI 10.1130/B26441.1.

Shuman, B., **Henderson, A.**, Colman, S. M., Stone, J. R., Stevens, L. R., Fritz, S. C., Power, M. J., and Whitlock, C., 2009, Holocene lake-level trends in the Rocky Mountains, U.S.A: *Quaternary Science Reviews* 28, 1861 - 1879.

Shuman, B., **Henderson, A.**, Plank, C., Stefanova, V., and Ziegler, S., 2009, Woodland-to-forest transition triggered by dry conditions in Minnesota after AD 1300: *Ecology* 90, 2792 – 2807.

TEACHING EXPERIENCE

University of Minnesota (2005 – 2009): Graduate Teaching Assistant
Geology and Cinema, Introduction to Geology, Glacial Geology (*weekly field trips)

Quaternary Paleoecology Program, University of Minnesota

- Seminar series chair (2006 – 2009): Organized and facilitated weekly interdisciplinary seminars.
- Short course co-chair (2007): “Phenology and Changing Seasonality of Climate: implications for ecology, hydrology, and civilization. Past, Present, Future.”

Brown University (2003): Undergraduate Teaching Assistant

- Earth System’s History (*weekend fieldtrips)

Bastia, Italy (1998 -1999): Taught spoken and written English to fourth graders

ACADEMIC HONORS AND AWARDS

Dissertation Fellowship, University of Minnesota – 2009 - 2010 (full year of support)

Loft Literary Center, Mentor Series Awards in Fiction and Nonfiction – 2009 and 2010

Departmental Fellowships, University of Minnesota – 2007 and 2008 (semester of support)

Howard Hughes Science Writing Fellowship, Brown University – 2003

Casey Shearer Award for Excellence in Creative Nonfiction, Brown University – 2002

GRANTS

Canadian Institute for Advanced Research Postdoctoral Fellowship – 2010 – 2012 (\$100,000)

NSF Doctoral Dissertation Research Improvement Grant – 2007 – 2009 (\$12,000)

Quaternary Paleoecology Minor Grant, University of Minnesota – 2007 – 2009 (\$5000)

Geologic Society of America Student Research Grant – 2009 (\$3750)

Department of Geology Summer Funds, University of Minnesota – 2007 – 2009 (\$2900)

H.E. Wright Footsteps Award, University of Minnesota – 2007 – 2008 (\$3000)

Department of Geology Travel Award, University of Minnesota – 2007 - 2009

Kerry Kelts Memorial Travel Award, University of Minnesota – 2007 – 2009

ISOSCAPES Travel Award – 2008

NASA Space Grant Scholarship, Juneau Ice field Research Program – 2002

Undergraduate Teaching and Research Grant, Brown University – 2001

FIELD EXPERIENCE

Minnesota (2005 – 2010): Collect lake sediments and Ground Penetrating Radar (GPR) profiles.

Rocky Mountains (2005 – 2010): Collect lake sediments, GPR profiles, vegetation surveys

Lake Bosumtwi, Ghana Drill Project (2004): Sediment scientist on Glad800 rig.

Juneau Ice Field (2002): Two-month field camp measuring ice and snow characteristics.

Plant Environmental Center, Brown University (2000 – 2003): Maintenance of conservatory plants.

Northeastern U.S. tidal marshes (2001): Vegetation ecology along climate and salinity gradients.

INVITED TALKS

Upcoming: Lamont-Doherty Earth Observatory, March 30

Federal Bureau of Investigation Laboratory, Quantico, Virginia, November, 2011

Pennsylvania State University, Earth Systems Center, October 2011

University of Maryland, Center for Environmental Science, October 2011

University of Minnesota Duluth, Large Lakes Observatory, 2009

Quaternary Paleoecology Seminar Series, University of Minnesota, Twin Cities, 2009

Carleton College, Northfield, Minnesota, 2007

PROFESSIONAL AFFILIATIONS

American Geophysical Union
Geologic Society of America
Ecological Society of America
American Association for the Advancement of Science
Association for Women Geoscientists

SYNERGISTIC ACTIVITIES

Referee: Journal of Hydrology, Geophysical Research Letters, *Geochimica et Cosmochimica Acta*
Reviewer of proposals for the Austrian Science Fund (FWF)
Panelist for NASA Astrobiology: Exobiology and Evolutionary Biology Panel
Session Convener, *Paleoclimate Insights from Vegetation Proxies and Models*, AGU (2010)
Student Representative, Association for Woman Geoscientists National Board (2007 – 2009)
Student Representative, Minnesota Chapter, Association for Women Geoscientists (2006 – 2007)
Institute of Technology Graduate Women Coordinator, University of Minnesota (2005 – 2006)

MEETING ABSTRACTS

Henderson, A.K., Freeman, K.H., Fox, D.L., The rise of C₄ grassland ecosystems, a climate puzzle. American Geophysical Union, San Francisco, CA, 2011.

Henderson, A.K., Freeman, K.H., Fox, D.L., The role of trees in the evolution of C₄ grassland ecosystems in North America, a molecular perspective. Geologic Society of America, Minneapolis, MN, 2011.

Henderson, A.K., Shuman, B., Huang, Y., Paleoclimate application of compound specific δ D analyses in the Rocky Mountains: modern calibration and Holocene temperature trends. Isocompound, Potsdam, Germany, 2009.

Henderson, A.K., Elliot, G., Shuman, B., Huang, Y., Ecologically significant Holocene temperature trends at the headwaters of the Colorado River. Ecological Society of America Conference, Albuquerque, New Mexico, 2009.

Henderson, A.K., Elliot, G., Shuman, B., Huang, Y., Comparison between mid-Holocene and twentieth century climatic change and alpine treeline fluctuations in the western U.S. based on compound-specific hydrogen isotopes, tree rings, pollen, and macrofossils. American Geophysical Union Conference, San Francisco, CA, 2008.

Henderson, A.K., Shuman, B., Hydrogen and oxygen isotopic composition of lakes in the western United States. ISOSCAPES meeting, Santa Barbara, CA, 2008.

Henderson, A.K., Plank, C., Shuman, B., North American moisture gradients over the past 15,000 years recorded by lake levels. American Geophysical Union, San Francisco, CA, 2007.

Henderson, A., Shuman, B., Hydrogen and oxygen isotopic composition of lakes in the western United States related to hydrology and seasonality of precipitation. Geological Society of America, Denver, CO, 2007.

Shuman, B., Henderson A., Mechenich, M., Stefanova, V. Late-Holocene moisture and fire history in the Park Range, northern Colorado. The American Quaternary Association Meeting, Bozeman, MT, 2006.

Henderson, A., Shuman, B., Ziegler, S. An ecologically-significant increase in moisture availability in central Minnesota during the late Holocene. Geological Society of America, North-Central section Meeting, Minneapolis, MN, 2005.

REFERENCES

Dr. Katherine H. Freeman

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