

Dr. Anne J. Jefferson

Department of Geology, Kent State University

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Education and Degrees

- 2006 **Ph.D., Geology, Oregon State University**
“Hydrology and geomorphic evolution of basaltic landscapes, High Cascades, Oregon”
- 2002 **M.S., Water Resources Science, University of Minnesota**
“Early Tertiary and modern hydrologic environments of the Stenkul Fiord area, Ellesmere Island, Canada”
- 2001 **B.A., Earth and Planetary Science, The Johns Hopkins University**
“Pedologic comparison and hydrogen and oxygen isotopic analysis of water extracted from eight soil orders.” University and departmental honors.

Experience

- 2012-present **Assistant Professor**, Department of Geology, Kent State University, Kent, Ohio
- 2007-2012 **Assistant Professor**, Department of Geography and Earth Sciences, University of North Carolina at Charlotte, Charlotte, North Carolina
- 2006-2007 **Post-doctoral Research Associate**, Department of Geosciences, Oregon State University, Corvallis, Oregon
- 2002-2006 **National Science Foundation Graduate Research Fellow**, Department of Geosciences, Oregon State University, Corvallis, Oregon
- 2001-2002 **Editorial and Teaching Assistant**, Water Resources Center and Water Resources Science program, University of Minnesota, St. Paul, Minnesota
- 2001 **Water Resources Planning Assistant**, Scott County, Shakopee, Minnesota

Research Funding

Active Research Funding

- 2011-2012 *Evaluating Restoration Success in the Watershed Context*
 PI: S. Clinton (UNCC)
 Co-PIs: **A. Jefferson** and C.J. Allan (UNCC)
 Funding agency: North Carolina Water Resources Research Institute
 Amount: \$50,000 to UNCC
- 2010-2013 *Influence of stormwater management structures on ecological function in urban streams*
 PI: S. McMillan (UNCC)
 Co-PIs: **A. Jefferson** and S. Clinton (UNCC), C. Tague (Univ. California Santa Barbara)
 Funding agency: National Science Foundation, Environmental Engineering
 Amount: \$320,121 to UNCC

Completed Research Funding

- 2011 *Characterizing the spatial variability of stable isotopes of water in a watershed*
 PI: **A. Jefferson**
 Funding agency: UNCC College of Liberal Arts and Sciences
 Amount: \$793 (internal)
- 2009-2010 *Groundwater interactions with headwater streams: a proposal to foster an independent research program for a junior faculty member*
 PI: **A. Jefferson**
 Funding agency: UNCC ADVANCE Bonnie Cone Fellowship
 Amount: \$17,730 (internal)
- 2008-2009 *Patterns and processes of island evolution in a large, regulated river*
 PI: **A. Jefferson**
 Funding agency: UNCC Faculty Research Grant
 Amount: \$6,000 (internal)

- 2007-2008 *Contributions of Glacier Melt to Upper Hood River Streamflow and Implications of Climate Change*
 PI: A. Nolin (Oregon State Univ.)
 Co-PIs: **A. Jefferson** and S. Lewis (Oregon State Univ.)
 Funding agency: Oregon Institute for Water and Watersheds
 Amount: \$30,000 to Oregon State Univ.
- 2005-2006 *Influence of climate change on water supply in the McKenzie River Basin: Analysis of long-term and spatial hydrologic data*
 PI: A. Nolin (Oregon State Univ.)
 Co-PIs: **A. Jefferson** (Oregon State Univ.) and G. Grant (USDA Forest Service)
 Funding agency: Oregon Center for Water and Environmental Sustainability
 Amount: \$41,212 to Oregon State Univ.
- 2004-2006 *Discharge, source areas, and water ages of spring-fed streams and implications for water management in the McKenzie River Basin*
 PI: G. Grant (USDA Forest Service)
 Co-PIs: **A. Jefferson** and S. Lewis (Oregon State Univ.)
 Funding agency: Eugene Water and Electric Board
 Amount: \$95,000 to Oregon State Univ.
- 2004-2005 *Drainage development on highly-permeable basaltic lavas of the Oregon Cascades*
 PI: **A. Jefferson**
 Funding agency: Geological Society of America student research grant
 Amount: \$2,800

Pending Research Funding

- 2012-2017 *PIRE Pre-Proposal: Dynamics of the Lake Kivu System: Geological, Biological and Hydrographic Impacts on Sustainability*
- Co-PI: C. Ebinger (Univ. Rochester, lead institution), A. Vodacek (Rochester Inst. Tech.), R. Hecky (Univ. of Minnesota-Duluth), C. Scholz (Syracuse Univ.), S. MacIntyre (Univ California Santa Barbara)
- Senior Personnel: **A. Jefferson** (Kent State Univ.) and others
- Funding Agency: National Science Foundation, Partnerships for International Research and Education
- Amount: \$667,172 to Kent State University

Publications

Journal Articles

1. **Jefferson, A.** 2011. Seasonal versus transient snow and the elevation dependence of climate sensitivity in maritime mountainous regions, *Geophysical Research Letters*, 38, L16402, doi:10.1029/2011GL048346.
2. Nolin, A., Phillippe, J., **Jefferson, A.**, and Lewis, S. 2010. Present and future contributions of glacier melt to summer flows in a Pacific Northwest watershed, *Water Resources Research*, W12509, doi:10.1029/2009WR008968.
3. O'Driscoll, M., Clinton, S., **Jefferson, A.**, Manda, A., and McMillan S. 2010. Urbanization Effects on Watershed Hydrology and In-Stream Processes in the Southern United States, *Water*, 3 (2), 605-648. (Invited review article)
4. **Jefferson, A.J.**, Hannula, K.A., Campbell, P.B., & Franks, S.E., 2010, The Internet as a resource and support network for diverse geoscientists, *GSA Today*, 20 (9), 59-61.
5. **Jefferson, A.**, Grant, G., Lancaster, S., and Lewis, S., 2010, Sequence and timescale of drainage development on a permeable basaltic landscape, *Earth Surface Processes and Landforms*, 35(7): 803-816.
6. **Jefferson, A.**, Nolin, A., Lewis, S., and Tague, C., 2008. Hydrogeologic controls on streamflow sensitivity to climatic variability, *Hydrological Processes*. 22: 4371–4385.
7. Tague, C., Grant, G., Farrell, M., Choate, J., and **Jefferson, A.**, 2008, Deep groundwater mediates streamflow response to climate warming in the Oregon Cascades, *Climatic Change* 86:189-210.
8. **Jefferson, A.**, Grant, G., and Rose, T., 2006, The influence of volcanic history on groundwater patterns on the west slope of the Oregon High Cascades, *Water Resources Research*, 42, W12411, doi:10.1029/2005WR004812.

Other Peer-Reviewed Publications

1. **Jefferson, A.**, Lees, J.M., McClinton, T. 2011. Synthesizing Knowledge of Ocean Islands Chapman Conference on The Galápagos as a Laboratory for the Earth Sciences; Puerto Ayora, Galapagos, Ecuador, 25-30 July 2011 [meeting report], *Eos*. 92(44): Article number: 2011ES003632R
2. Cashman, K.V., Deligne, N.I., Gannett, M.W., Grant, G.E, and **Jefferson, A.**, 2009, Fire and water: Volcanology, geomorphology, and hydrogeology of the Cascade Range, central Oregon, in O'Connor, J.E., Dorsey, R.J., and Madin, I.P., eds., *Volcanoes to Vineyards: Geologic Field Trips through the Dynamic Landscape of the Pacific Northwest*: Geological Society of America Field Guide 15, p. 539-582, doi: 10.1130/2009.fld015(26).

3. **Jefferson, A.**, Grant, G., and Lewis, S., 2007. A river runs underneath it: geological control of spring and channel systems and management implications, Cascade Range, Oregon. In M.J. Furniss, C.F. Clifton, and K.L. Ronnenberg, eds. *Advancing the Fundamental Sciences: Proceedings of the Forest Service National Earth Sciences Conference*. PNW-GTR-689. Portland, OR: U.S.D.A. Forest Service, PNW Research Station. p. 391-400.

Submitted Manuscripts Under Review

1. **Jefferson, A.** and McGee, R.W. Understanding channel network extent in the context of flow generation processes, historical land use, and landscape dissection. *Earth Surface Processes and Landforms*, in review.

Presentations (*italics* indicate student co-author)

Invited Seminars

- 2011 University of South Carolina, Department of Geography
University of Iowa, Department of Geological Sciences
University of North Carolina at Chapel Hill, Department of Geological Sciences
- 2009 University of Montana, Department of Geosciences
Utah State University, Department of Watershed Sciences
- 2007 UNC Charlotte Infrastructure and Environmental Systems seminar
Climate Change Film Festival and Forum, Bend, Oregon
- 2006 Association of Power Biologists 47th Annual Workshop, Eugene, Oregon
- 2005 U.S. Geological Survey Oregon Water Science Center
- 2004 Oregon Water Resources Department Commissioners
- 1997 US Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi

Invited Conference Presentations (*italics* denote student co-author)

- 2012 **Jefferson, A.** Timescales of drainage network evolution are driven by coupled changes in landscape properties and hydrologic response, Consortium of Universities for the Advancement of Hydrologic Sciences, Inc. (CUAHSI) Biennial Meeting, Boulder, CO, July 2012
- 2011 **Jefferson, A.** and *McGee, R.W.*, Understanding channel network extent in the North Carolina Piedmont in the context of legacy land use, flow generation processes, and landscape dissection, American Geophysical Union Fall Meeting, San Francisco, CA, December 2011.

Jefferson A. and d'Ozouville, N. Controls on the hydrologic evolution of Quaternary volcanic landscapes, American Geophysical Union Fall Meeting, San Francisco, CA, December 2011.

Jefferson, A. Top down or bottom up? Volcanic history, climate, and the hydrologic evolution of volcanic landscapes, Chapman Conference on The Galápagos as a Laboratory for the Earth Sciences; Puerto Ayora, Galapágos, Ecuador, July 2011 (*plenary speaker*)

- 2009 **Jefferson, A.** On a template set by basalt flows, hydrology and erosional topography coevolve in the Oregon Cascade Range, Geological Society of America Annual Meeting, Portland, OR, October 2009.

Volunteered Abstracts since 2007 (*italics* denote student co-author)

- 2012 *Bell, C., McMillan, S., Tague, C., Jefferson, A. and Clinton, S.* Using Watershed Modeling to Optimize Management of Urban Stormwater to Control Stream Nitrogen, American Ecological Engineering Society, Syracuse, NY, June 2012.

Osygian, M., Clinton, S., and Jefferson, A. Evaluating restoration effects on transient storage and hyporheic exchange in urban and forested streams, Society for Freshwater Science Annual Meeting, Louisville, KY, May 2012.

- 2011 **Jefferson, A.** and *Moore, C.* Spatial variability in groundwater-stream interactions in first-order North Carolina Piedmont streams, Geological Society of America Annual Meeting, Minneapolis, MN, October 2011.

- 2010 **Jefferson, A.**, Spatial heterogeneity in isotopic signatures of baseflow in small watersheds: implications for understanding watershed hydrology, American Geophysical Union Fall Meeting, San Francisco, CA, December 2010.

Grant, G., Jefferson, A., Tague, C., Lewis, S., The Geologic Sponge: What Do Storage Dynamics Reveal About Runoff Generation In Young Volcanic Landscapes?, American Geophysical Union Fall Meeting, San Francisco, CA, December 2010.

Jefferson, A., McGee, R., Moore, C. and Caveny-Cox, C. Hydrogeomorphic controls on the expression of stream water in less than 1 km² Piedmont watersheds, Northeastern/Southeastern Geological Society of America Meeting, Baltimore, MD, March 2010.

Freyer, J.B. and Jefferson, A. Effects of river management & sediment supply on island evolution in Pool 6 of the Upper Mississippi River, southeast Minnesota, Upper Midwest Stream Restoration Symposium, LaCrosse, WI, February 2010.

- 2009 **Jefferson, A., Abraham, J., Campbell, T., and Moore, C.** Groundwater contributions to headwater streams on fractured rock in the North Carolina Piedmont and Blue Ridge. Geological Society of America Annual Meeting, Portland, OR, October 2009.

Moore, C. and Jefferson, A. Sediment size distributions in forested headwater streams of the North Carolina Piedmont. Geological Society of America Annual Meeting, Portland, OR, October 2009.

Hannula, K., **Jefferson, A.**, Campbell, P. and Franks, S. Blogs as a resource and social support network for women geoscientists. Geological Society of America Annual Meeting, Portland, OR, October 2009.

- 2008 **Jefferson, A.** Secular Streamflow Trends in Watersheds Receiving Mixed Rain and Snow, Pacific Coast and Cascades Ranges. American Geophysical Union Fall Meeting, San Francisco, CA, December 2008.

Grant, G., Tague, C., **Jefferson, A.**, Lewis, S. Geological framework for interpreting streamflow and temperature regimes under climate warming. American Fisheries Society Western Division Annual Meeting, Portland, OR, June 2008.

- 2007 **Jefferson, A.**, Grant, G., and Lewis, S. Drainage Density: A Framework for Predicting Peak and Low Flows in Ungaged Catchments, American Geophysical Union Fall Meeting, San Francisco, CA, December 2007.

Jefferson, A., Nolin, A., Lewis, S. and Tague, C. Groundwater influences summer streamflow response to climate change in the Oregon Cascades, Geological Society of America Annual Meeting, Denver, CO, October 2007.

Grant, G., **Jefferson, A.**, Lewis, S. and O'Connor, J. Drainage density integrates geology and climate, reflects landscape evolution, and constrains paleoflood magnitudes, 4th International Paleoflood Workshop, Crete, Greece, June 2007.

Teaching

Courses Developed and Taught (2 courses per semester load + labs)

Ph.D./M.S. level

Analysis and Acquisition of Scientific Data (3 credits) 2009; 2010

M.S./Advanced Undergraduate level

Fluvial Processes and Laboratory (4 credits) 2008; 2009; 2010; 2011

Hydrogeology and Laboratory (4 credits) 2008; 2010; 2012

Advanced Undergraduate level

Earth Sciences Seminar: Climate Change (1 credit) 2008; 2009; 2010; 2011

Introductory Undergraduate level

Earth Sciences – Geography (3 credits) 2007; 2008; 2009

The Earth Surface and Laboratory (4 credits) 2005 (Oregon State)

Graduate Students Theses

- Alea Tuttle M.S. Earth Sciences, UNC Charlotte, August 2012
Post-project evaluations of urban stream restoration sites in the southeastern Piedmont: streambed sediment denitrification and geomorphic complexity (co-advised by S. McMillan)
- Ralph W. McGee M.S. Earth Sciences, UNC Charlotte, May 2011
Hydrogeomorphic processes influencing ephemeral streams in forested watersheds of the southeastern Piedmont U.S.A.
- Cameron Moore M.S. Earth Sciences, UNC Charlotte, May 2011
Surface/Groundwater Interactions and Sediment Characteristics of Headwater Streams in the Piedmont of North Carolina

Graduate Students Continuing at UNC Charlotte

- Jason Shiflet Dissertation advisor, Infrastructure and Environmental Systems Ph.D. Program, Using Compound-Specific Stable Isotope Analysis (CSIA) and Fate and Transport Modeling to Quantify the Contribution of Co-mingled Chlorinated Ethene Plumes, Fall 2007 – present (expected defense: fall 2012, employed full-time).
- Colin Bell Thesis Co-Advisor, Civil Engineering M.S. program. Modeling the cumulative impacts of stormwater management on watershed hydrology and biogeochemistry, Fall 2011-present. (Co-advised by John Bowen and Sara McMillan)
- Mackenzie Osypian Thesis Co-Advisor, Civil Engineering M.S. program. The quantity and ecological effect of transient storage created by artificial versus natural in-stream structures, Fall 2011-present. (Co-advised by Sandra Clinton and John Daniels)
- Brandon Blue Thesis Co-advisor, Earth Science M.S. program, Streamflow dynamics in urban watersheds, Spring 2010 – present. (Co-advised by Sara McMillan; expected defense: fall 2012)

Since 2007, I have also served as a committee member for 3 PhD students, 7 MS students, and 1 undergraduate honors thesis. I have also supervised two undergraduate independent study projects.

Professional and University Service

Associate Editor, Geological Society of America Bulletin, 2012-present.

Reviewer for National Science Foundation; Water Resources Research; Geological Society of America Bulletin; Hydrological Processes; Journal of Hydrology; Journal of the American Water Resources Association; Journal of Geoscience Education; Journal of Volcanology and Geothermal Research; Earth Surface Processes and Landforms; Forest Ecology and Management; Computers, Environment, and Urban Systems

Panelist, Quaternary Geology and Geomorphology Division, Geological Society of America, October 2010-2012

At-large member, Diversity in the Geosciences committee, Geological Society of America, July 2010-2012

Events Co-chair, Geological Society of America, Southeastern Section meeting, April 2008.

Campus Representative, Consortium of Universities for the Advancement of Hydrologic Science, Incorporated (CUAHSI), University of North Carolina, 2011-2012.

Co-convenor, Geological Society of America annual meeting, topical sessions:

“Stream-Groundwater Interaction: New Understanding, Innovations, and Applications at Bedform, Reach, and River Network Scales,” October 2009.

“Hydrogeomorphic Processes in Hillslopes, Rivers, and Landscapes,” October 2010.

“Geomorphology of the Anthropocene: The surficial legacy of past and present human activities,” November 2012

“Hydrology of Urban Groundwater, Streams, and Watersheds,” November 2012

Field trip co-leader, Kirk Bryan Field Trip at Geological Society of America Annual Meeting, November 2012.

Convenor, ScienceOnline conference, session: Casting a wider net: Promoting gender and ethnic diversity in STEM, January 2010

Service on UNC Charlotte departmental committees including two search committees, Graduate Advisory Council, MS Earth Science Committee, Mentoring Committee

Outreach and Community Service

Writer for Highly Allochthonous (<http://www.all-geo.org/highlyallochthonous>), winner of the 2010 Research Blogging award for Conservation or Geosciences, ~30,000 page views / month, 2008-present

Interviews with McClatchey News Syndicate, Charlotte Observer (newspaper), Charlotte Now (TV), and local TV news segments on regional and natural water resources issues, 2007-present

Judge and mentor for local, regional, and international science and engineering fairs for middle school and high school students through Society for Science and the Public, 2001-2008

Instructor, Willamette Valley Watershed Partnership Project, 2 week summer institute and follow-up workshops for middle school and high school environmental science teachers, 2005-2006

Recognition and Awards

“Strange Quark” (second place) award for Three Quarks Daily 2011 Online Science Writing contest for essay on “Levees and the Illusion of Flood Control” (<http://all-geo.org/highlyallochthonous/2011/05/levees-and-the-illusion-of-flood-control/>). This essay also appeared on the Scientific American website.

Honorable Mention, Universities Council on Water Resources Dissertation Award, 2006. This award is given to the top 3 PhD dissertations on water science in the United States each year.

John Montagne Fund Student Research Grant Award, Geological Society of America, 2004.

National Science Foundation Graduate Research Fellowship, 2002-2005.

Phi Beta Kappa, 2001.