

# Dr. Anne J. Jefferson

Department of Geology, Kent State University

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## Education and Degrees

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- 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

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- 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

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### Active External Research Funding

- 2014-2016 Hydrology and Water Quality Performance of Green Infrastructure, Watershed Stewardship Center, West Creek Reservation  
PI: **A. Jefferson**  
Co-PIs: L. Kinsman-Costello and R. Coffman (Kent State U.)  
Funding agency: Cleveland Metroparks  
Amount: \$90,000 to Kent State U.
- 2012-2016 Bridging the Conceptual Divide Between Theoretical and Applied Environmental Chemistry  
PI: **A. Jefferson**  
Co-PIs: J. Ortiz, D. Dees (Kent State U.), E. Griffith (U Texas)  
Funding agency: National Science Foundation, Division of Undergraduate Education (DUE 1140980)  
Amount: \$189,235 to Kent State U.

### Completed External Research Funding

- 2010-2015 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 (CBET 1034043)  
Amount: \$391,341 to UNCC
- 2014-2015 Testing the (storm) Waters: Techniques for Surface Reclamation on Urban Brownfields  
PI: R. Coffman  
Co-PIs: C. Blackwood, **A. Jefferson**, R. Liu  
Funding agency: U.S. Environmental Protection Agency P3: People, Prosperity and the Planet Student Design Competition  
Amount: \$14,685 to Kent State U.
- 2014-2015 Characterizing stream restoration's water quality improvement potential through hyporheic exchange enhancement  
PI: **A. Jefferson**  
Funding agency: Ohio Water Resources Center (USGS funds)  
Amount: \$18,878 to Kent State U.

2014-2015	Assessing the Effects of Green Infrastructure on Metals Concentrations in Stormwater Runoff PI: <b>A. Jefferson</b> Funding agency: Cleveland Metroparks Amount: \$4,693 to Kent State U.
2011-2012	Evaluating Restoration Success in the Watershed Context PI: S. Clinton (UNCC) Co-PIs: <b>A. Jefferson</b> and C.J. Allan (UNCC) Funding agency: North Carolina Water Resources Research Institute Amount: \$50,000 to UNCC
2007-2008	Contributions of Glacier Melt to Upper Hood River Streamflow and Implications of Climate Change PI: A. Nolin (Oregon State Univ.) Co-PIs: <b>A. Jefferson</b> 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: <b>A. Jefferson</b> (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: <b>A. Jefferson</b> 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: <b>A. Jefferson</b> Funding agency: Geological Society of America student research grant Amount: \$2,800

### Active Internal Research Funding

2015-2017	Answering the “What If?” Questions about Green Infrastructure Through Numerical Modeling of Urban Stormwater Management PI: <b>A. Jefferson</b> Funding agency: Kent State University, Research and Sponsored Programs, Post-doctoral Scholars competition Amount: 1 year salary + benefits for post-doctoral scholar
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## Completed Internal Research Funding

2013-2014	The Cuyahoga River as a Laboratory for Water Resources Research Co-PIs: <b>A. Jefferson</b> , R. Coffman, C. Blackwood, L. Leff Funding agency: Kent State University, College of Arts & Sciences Collaborative Research Award Amount: \$39,526 (internal)
2013-2014	Surveyor's Total Station: Vital Resource for Collaborative Research in the Geology Department PI: <b>A. Jefferson</b> Co-PIs: A. Shakoor, N. Wells, R. Feldmann, C. Schweitzer Funding agency: Kent State University, College of Arts & Sciences Research Resources Award Amount: \$7,990 (internal)
2011	Characterizing the spatial variability of stable isotopes of water in a watershed PI: <b>A. Jefferson</b> 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: <b>A. Jefferson</b> 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: <b>A. Jefferson</b> Funding agency: UNCC Faculty Research Grant Amount: \$6,000 (internal)

## Publications

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### Journal Articles and Monograph Chapters (*italics* denote student co-author)

Thomson-ISI total citations: 209, h-index: 7 as of 1 September 2015

1. *Jarden, K.M., Jefferson, A., and Grieser, J.M.* 2015. [Assessing the effects of street-scale green infrastructure retrofits on hydrograph characteristics, northeastern Ohio, USA](#), *Hydrologic Processes*, online ahead of print. doi: 10.1002/hyp.10736.
2. **Jefferson, A., Bell, C., Clinton, S., and McMillan, S.** 2015. [Application of isotope hydrograph separation to understand urban stormwater dynamics](#), *Hydrological Processes*, 29(25): 5290-5306. doi: 10.1002/hyp.10680

3. Griffith, E.M., Ortiz, J.D., and **Jefferson, A.**, 2015. [Mimicking the Rayleigh isotope effect in the oceans](#), *Oceanography*, 28(4): 96-101. Doi: 10.5670/oceanog.2015.89.
4. *Reilly, D.*, Singer, D., **Jefferson, A.**, and Eckstein, Y. 2015. [Identification of Local Groundwater Pollution in Northeastern Pennsylvania: Marcellus Flow-back or Not?](#), *Environmental Earth Sciences*, 73(12): 8097-8109. doi:10.1007/s12665-014-3968-0.
5. **Jefferson, A.**, Ferrier, K., Perron, J.T., and Ramalho, R. 2014. [Controls on the hydrological landscape evolution of shield volcanoes and volcanic ocean islands](#), pp. 185-214 in Harpp, K.S., Mittelstaedt, E., d'Ozouville, N., and Graham, D.W. (eds), *The Galapagos: A Natural Laboratory for the Earth Sciences*, AGU Geophysical Monograph Series.
6. **Jefferson, A.**, Wegman, K., and Chin, A. 2013. [Geomorphology of the Anthropocene: Understanding the surficial legacy of past and present human activities](#), *Anthropocene*, 2: 1-3, doi:10.1016/j.ancene.2013.10.005.
7. *Freyer, J.B.* and **Jefferson, A.**, 2013. [An exception to island loss in the engineered Upper Mississippi River: history of land growth in Pool 6 and implications for restoration](#), *Anthropocene*, 2: 65-75, doi:10.1016/j.ancene.2013.10.004.
8. **Jefferson, A.** and *McGee, R.W.* 2013. [Channel network extent in the context of historical land use, flow generation processes, and landscape evolution](#), *Earth Surface Processes and Landforms*, 38(6): 601-613, doi:10.1002/esp.3308.
9. **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.
10. 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.
11. 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.
12. **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.
13. **Jefferson, A.**, Grant, G., Lancaster, S., and Lewis, S., 2010, [Coevolution of hydrology and topography on a basalt landscape in the Oregon Cascade Range, USA](#), *Earth Surface Processes and Landforms*, 35(7): 803-816. doi: 10.1002/esp.1976.
14. **Jefferson, A.**, Nolin, A., Lewis, S., and Tague, C., 2008. [Hydrogeologic controls on streamflow sensitivity to climatic variability](#), *Hydrological Processes*. 22: 4371–4385.

15. 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.
16. **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. Keim, R., Kendall, C., and **Jefferson, A.**, 2014, [The Expanding Utility of Laser Spectroscopy: Laser Specs for Field Hydrology and Biogeochemistry: A USGS-CUAHSI Virtual Workshop; 27 January to 28 February 2014](#) [meeting report], *Eos*. 95(17): 144. DOI: 10.1002/2014EO170007
2. Clinton, S.M., **Jefferson, A.J.**, Allan, C.J., and Osypian, M., 2014, [Evaluating Restoration Success in the Watershed Context](#), North Carolina Water Resources Research Institute Project Report 11-02-S. 49 pp.
3. **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
4. 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).
5. **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.

### Manuscripts in Review (*italics* denote student co-author)

1. Bell, C.D., McMillan, S.K., Clinton, S.M., and Jefferson, A.J. *in review*. Hydrologic response to stormwater control measures in urban watersheds. *Journal of Hydrology*.
2. Turner, V.K., Jarden, K.M., and **Jefferson, A.** *in review*. Resident perspectives on green infrastructure in an experimental suburban stormwater management program. *Cities and the Environment*.
3. **Jefferson, A.**, Clinton, S., and Osypian, M. *in revision*. Partitioning of transient storage between the surface and hyporheic in restored and unrestored headwater streams. (in revision for *Ecological Engineering*)

## Presentations (*italics* indicate student co-author)

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### Invited Seminars

- 2015 "Stormwater-stream connectivity: Process, context, and tradeoffs."  
Cleveland State University, Department of Biological, Geological, and Environmental Sciences, October 2015
- 2014 "Stormwater-stream connectivity: Process, context, and tradeoffs."  
CUAHSI Cyberseminar Series on Sustainable Urban Streams, Cyberseminar (<https://www.cuahsi.org/Posts/Entry/13551>), December 2014
- "Complexity<sup>2</sup>: Process insights in urban and restored streams and watersheds"  
Ohio State University, School of Earth Sciences, Columbus, OH, September 2014
- "The Flow Below: Hyporheic exchange and groundwater-stream interactions"  
Northeast Section of the Ohio Water Environment Association, Parma, OH, April 2014
- 2013 "Evaluating success of urban stream restoration in an ecosystem services context"  
Kent State University Water Symposium, Kent, OH, November 2013
- "Evaluating success of urban stream restoration in an ecosystem services context"  
Kent State University, Department of Biological Sciences, Kent, OH, March 2013
- "Drainage network evolution is driven by coupled changes in landscape properties and hydrologic response."  
Denison University, Department of Geosciences, Granville, OH, March 2013
- "Evaluating success of urban stream restoration in an ecosystem services context"  
North Dakota State University, Department of Geosciences, Fargo, ND, March 2013
- 2012 "Drainage network evolution is driven by coupled changes in landscape properties and hydrologic response."  
The Johns Hopkins University, Department of Geography & Environmental Engineering, Baltimore, MD, November 2012
- "The Science of Streams in the City"  
Ashland University, Environmental Lecture Series, Ashland, OH, October 2012
- 2011 "Where do streams come from? Interplay of geology and hydrology on North Carolina and Oregon landscapes"  
University of South Carolina, Department of Geography, Columbia, SC, 2011
- "Where do streams come from? Interplay of geology and hydrology on North Carolina and Oregon landscapes"  
University of Iowa, Department of Geological Sciences, Iowa City, IA, February 2011

- "Tracing water sources and dynamics in forested and urban headwater streams of North Carolina's Piedmont"  
University of North Carolina at Chapel Hill, Department of Geological Sciences, Chapel Hill, NC, January 2011
- 2009 "Geological regulation of flowpaths and hydrographs: Lessons from the Oregon Cascades"  
Utah State University, Department of Watershed Sciences, Logan, UT, March 2009
- "Geological regulation of flowpaths and hydrographs: Lessons from the Oregon Cascades"  
University of Montana, Department of Geosciences, Missoula, MT, February 2009
- 2007 "Drainage density: A framework for predicting peak and low flows in ungauged catchments"  
UNC Charlotte Infrastructure and Environmental Systems Seminar, Charlotte, NC, October 2007
- "Climate change now: On-going and future changes to Oregon's snowpack and streamflow"  
Climate Change Film Festival and Forum, Bend, OR, April 2007
- 2006 "Hydrology of the McKenzie River watershed"  
Association of Power Biologists 47<sup>th</sup> Annual Workshop, Eugene, OR, May 2006
- 2005 "Five years from snowfall to spring water: Understanding the sources of streamflow in the Oregon Cascades"  
U.S. Geological Survey Oregon Water Science Center, Portland, OR, February 2005
- 2004 "Understanding the source of water in Cascades rivers and planning for climate change"  
Oregon Water Resources Department Commissioners, Salem, OR, October 2004
- "Research activities on spring-fed streams in the McKenzie River watershed"  
"Spring Fling", workshop for Forest Service and BLM personnel to discuss the management implications of large springs on federal lands, Corvallis, OR, June 3, 2004
- 1997 "Island and delta development, sediment loads, and deposition in Lower Pool 6, Mississippi River"  
US Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS, July 1997

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

- 2015 **Jefferson, A., Jarden, K.**, and Grieser, J.M. Retrofitting stormwater retention on headwater streets: hydrologic effects of catchment-scale green infrastructure. Geological Society of America Annual Meeting, Baltimore, MD, November 2015.
- Jefferson, A., Bell, C.D.,** McMillan, S. and Clinton S. Quantifying the influences of stormwater control measures on urban headwater streamflow. Geological Society of America Annual Meeting, Baltimore, MD, November 2015.



- Jarden, K., Jefferson, A., Turner, V.K., Grieser, J.M., Schaefer, D.* Assessing hydrologic impacts of street-scale green infrastructure investments for suburban Parma, Ohio. Association of American Geographers, Chicago, IL, April 2015
- 2014 **Jefferson, A.**, McMillan, S., and Clinton, S. Evaluating the success of urban stream restoration on hyporheic exchange and nutrient retention, [British Hydrological Society, Birmingham, UK](#), September 2014
- 2013 **Jefferson, A.**, Clinton, S., *Oyypian, M.*, McMillan, S., *Tuttle, A.* Evaluating the success of urban stream restoration in an ecosystem services and watershed context, [Upper Midwest Stream Restoration Symposium, La Crosse, WI](#), February 2013 (*keynote speaker*)
- 2012 **Jefferson, A.** Evaluating the success of urban stream restoration in an ecosystem services context, Kent State University Water Symposium, Kent, OH, October 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, Galapagos, 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.
- Conference Abstracts** (*italics* denote student co-author)
- 2015 **Jefferson, A.** and *Baker, S.B.* Dynamic Hydraulic Conductivity, Streambed Sediment, and Biogeochemistry Following Stream Restoration, American Geophysical Union Fall Meeting, San Francisco, CA, December 2015.
- Bell, C.D.*, McMillan, S., Clinton, S., and **Jefferson, A.** Hydrologic response to watershed metrics describing urban development and mitigation with stormwater control measures, Geological Society of America Fall Meeting, Baltimore, MD, November 2015.

- Lewis, S.L., Grant, G.E., Nolin, A.W., *Hempel, L.*, **Jefferson, A.**, and Selker, J. How low will they go? The response of headwater streams in the Oregon Cascades to the 2015 drought. Geological Society of America Fall Meeting, Baltimore, MD, November 2015.
- Jarden, K.*, **Jefferson, A.**, Grieser, J.M., Schaefer, D. Assessing hydrologic impacts of street-scale green infrastructure investments for suburban Parma, Ohio. Ohio Stormwater Conference, Sandusky, OH, May 2015.
- Baker, S.B.* and **Jefferson, A.** Changes in hyporheic exchange and subsurface processes following stream restoration. Upper Midwest Stream Restoration Symposium, Dubuque, IA, February 2015.
- 2014 **Jefferson, A.**, Griffith, E.M., Ortiz, J.D., Dees, D. and *Merchant, W.*, Hands-on Experiences with Stable Isotopes in the Geosciences Curriculum. Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Baker, S.B.* and **Jefferson, A.** Changes in hyporheic exchange and subsurface processes following stream restoration. Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Brown, K.M.* and **Jefferson, A.** After the dam comes down: groundwater-stream interactions and water quality effects of restored and unrestored reaches in northeastern Ohio, Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Griffith, E.M., Ortiz, J.D., **Jefferson, A.**, Dees, D. and *Merchant, W.*, Rayleigh Isotope Distillation Module – Development and Transferability in Geoscience Education. Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Jarden, K.*, **Jefferson, A.**, Grieser, J., and Schafer, D. Assessing hydrologic impacts of street-scale green infrastructure investments for suburban Parma, Ohio. Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Reynolds, A.* and **Jefferson, A.** Sensitivity of precipitation isotope meteoric water lines and seasonal signals to sampling frequency and location. Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Traub, E.L.*, **Jefferson, A.**, and Singer, D.M. The effects of biogeochemical sinks on the mobility of trace metals in an area affected by acid mine drainage, Huff Run, Ohio. Geological Society of America Annual Meeting, Vancouver, BC, October 2014.
- Baker, S.B.* and **Jefferson, A.**, Development of hyporheic exchange and nutrient uptake following stream restoration, CUAHSI Biennial Colloquium, July 2014
- Brown, K.* and **Jefferson, A.** After the dam comes out: groundwater-stream interactions and water quality impacts of former reservoir sites, CUAHSI Biennial Colloquium, July 2014

- Garner, G., Jefferson, A.,* McMillan, S., *Bell, C.,* and Hannah, D.M., Stormwater control measures modify event-based stream temperature dynamics in urbanized headwaters, CUAHSI Biennial Colloquium, July 2014
- Jarden, K., Jefferson, A.,* Grieser, J., and Schafer, D. Assessing impacts of green infrastructure at the watershed scale for suburban streets in Parma, Ohio, CUAHSI Biennial Colloquium, July 2014
- Jefferson, A.,** Griffith, E., Ortiz, J., and Dees, D., Hands-On Experiences with Stable Isotopes in the Geosciences Curriculum, Laser Specs for Field Hydrology and Biogeochemistry (CUAHSI/USGS workshop), February 2014
- Reynolds, A.* and **Jefferson, A.,** Sensitivity of precipitation isotope meteoric water lines and seasonal signals to sampling frequency and location, Laser Specs for Field Hydrology and Biogeochemistry (CUAHSI/USGS workshop), February 2014
- 2013 **Jefferson, A.,** Clinton, S., *Osygian, M.,* Transient storage versus hyporheic exchange in low-gradient headwater streams, American Geophysical Union Fall Meeting, San Francisco, CA, December 2013.
- Lewis, S.L., Safeeq, M., **Jefferson, A.,** and Grant, G.E., Revisiting watershed drainage density: New considerations for hydrologic prediction, Geological Society of America Annual Meeting, Denver, CO, October 2013.
- Jefferson, A.,** Clinton, S., *Osygian, M.,* Evaluating the effectors of restoration on transient storage and ecosystem services in urban headwater streams, Society for Ecological Restoration, Midwest-Great Lakes Meeting, Wooster, OH, April 2013
- Deligne, N.I.,* Cashman, K.V., Grant, G.E., and **Jefferson, A.** Potential impact of lava flows on regional water supplies: case study of central Oregon Cascades volcanism and the Willamette Valley, USA, European Geosciences Union annual meeting, Vienna, Austria, April 2013
- 2012 **Jefferson, A.,** *Blue, B.,* McMillan, S. Characterizing the effects of hydrometeorology and stream networks on urban stream temperature response to precipitation, Geological Society of America Annual Meeting, Charlotte, NC, November 2012.
- Bell, C.,* McMillan, S., **Jefferson, A.,** Tague, C., and Clinton, S. Using Computer Modeling To Assess Hydraulic Parameter Transferability From An Undeveloped To An Urban Watershed With Stormwater Infrastructure, Geological Society of America Annual Meeting, Charlotte, NC, November 2012.
- Osygian, M.,* Clinton, S., and **Jefferson, A.** Evaluating restoration effects on transient storage and hyporheic exchange in urban and forested streams, Geological Society of America Annual Meeting, Charlotte, NC, November 2012.

- Safrit, C.*, Clinton, S., McMillan, S. and **Jefferson, A.** Impacts of Stormwater Management on Temperature Response in Urban Streams, Geological Society of America Annual Meeting, Charlotte, NC, November 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 km<sup>2</sup> 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, 4<sup>th</sup> International Paleoflood Workshop, Crete, Greece, June 2007.
- 2006 **Jefferson, A.**, Nolin, A., Lewis, S., Payne, M., and Grant, G. Climate variability, snowmelt distribution, and effects on streamflow in a Cascades watershed, Eastern Snow Conference, Newark, DE, June 2006.
- 2005 **Jefferson, A.** and Grant, G., Drainage network development on a porous landscape, American Geophysical Union Fall Meeting, San Francisco, CA, December 2005.
- Tague, C., Grant, G., Farrell, M., and **Jefferson, A.**, Characterizing regional spatial variation in summer streamflow response to climate warming in the mountains of the Western US, American Geophysical Union Fall Meeting, San Francisco, CA, December 2005.
- Jefferson, A.**, and Grant, G., Groundwater systems of the McKenzie River watershed, Oregon High Cascades, Groundwater Under the Pacific Northwest: Integrating Research, Policy, and Education, Stevenson, WA, November 2005.
- Grant, G., O'Connor, J., Wampler, P., Lancaster, S., **Jefferson, A.**, Lewis, S., and Ronnenberg, K. Geological controls on the abundance of gravel in rivers, International Conference on Gravel Bed Rivers VI, Lienz, Austria, September 2005.
- Jefferson, A.**, Rose, T., and Grant, G., Volcanic aquifers feed large springs on the Oregon High Cascades mafic platform, American Geophysical Union Joint Assembly, New Orleans, LA, May 2005.
- Grant, G., Tague, C., and **Jefferson, A.**, The ultimate hydrologic sponge: hydrology and dynamics of a young volcanic arc in a Mediterranean climate, American Geophysical Union Joint Assembly, New Orleans, LA, May 2005.
- 2004 **Jefferson, A.**, Grant, G., Lewis, S., and Tague, C., Geology broadly predicts summer streamflow in volcanic terrains: lessons from the Oregon Cascades, American Geophysical Union Fall Meeting, San Francisco, CA, December 2004.

- Grant, G., Tague, C., and **Jefferson, A.**, Geologically mediated groundwater storage can be a first-order control on streamflow response to changing climate, American Geophysical Union Fall Meeting, San Francisco, CA, December 2004.
- 2003 **Jefferson, A.**, and Grant, G., Recharge areas and discharge of groundwater in a young volcanic landscape, McKenzie River, Oregon, Geological Society of America Annual Meeting, Seattle, WA, November 2003.
- Grant, G., **Jefferson, A.**, O'Connor, J.E., Tague, C., Lewis, S., and Haluska, T.L., Drainage network evolution in volcanic landscapes: how much time does it take to get the river flowing?, Geological Society of America Annual Meeting, Seattle, WA, November 2003.
- 2002 **Jefferson A.** and Jahren, A.H., Isotopic characterization of summer streamflow at Stenkul Fiord, Ellesmere Island, American Institute of Hydrology Annual Meeting, October 2002.
- 2001 Jefferson, C. and **Jefferson, A.**, 100 years of change in island morphology and backwater bathymetry in pools 6-10, Mississippi River Research Consortium, La Crosse, WI, May 2001.
- 1997 **Jefferson, A.** and Jefferson, C., Changes in island morphology, delta development, sediment loads and deposition in Pool 6, Upper Mississippi River, American Association for the Advancement of Science Annual Meeting, Seattle, WA, February 1997.
- 1996 Jefferson C. and **Jefferson, A.**, Sedimentation in Trempealeau Bay, Pool 6, Mississippi River. Mississippi River Research Consortium, La Crosse, WI, May 1996.

## Teaching

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**Courses Taught at Kent State University** (Hyperlinks go to a document containing the syllabus, peer teaching evaluations, SSIs, and sample course materials and exams.)

*Ph.D./M.S. level*

[College Teaching of Applied Geology](#) (1 credit) F2012; F2013

*M.S./Advanced Undergraduate level*

[Urban Hydrology](#) (3 credits) S2013

[Fluvial Processes](#) (3 credits) F2013

[Watershed Hydrology](#) (3 credits) S2014, F2015

*Core Classes*

[Environmental Earth Science](#) (3 credits) F2014 (honors)

**Courses Taught at UNC Charlotte** (Hyperlinks go to the most recent syllabus.)

*Ph.D./M.S. level*

[Analysis and Acquisition of Scientific Data](#) (3 credits) F2009; F2010

*M.S./Advanced Undergraduate level*

[Fluvial Processes and Laboratory](#) (4 credits)

S2008; S2009; S2010; F2011

[Hydrogeology and Laboratory](#) (4 credits)

F2008; S2010; S2012

*Advanced Undergraduate level*

[Earth Sciences Seminar: Climate Change](#) (1 credit)

F2008; F2009(x2); F2010

[Earth Sciences Seminar: Natural Disasters](#) (1 credit)

F2011

*Introductory Undergraduate level*

[Earth Sciences – Geography](#) (3 credits)

F2007; S2008; S2009

### **Courses Taught at Oregon State University**

The Earth Surface and Laboratory (4 credits)

Sum2005

### **Post-doctoral Scholars Mentored**

Pedro M. Avellaneda February 2016-present

### **Graduate Students Theses**

Kimberly Jarden

M.S. Geology, Kent State University, April 2015

[Assessing impacts of green infrastructure at the watershed scale for suburban streets in Parma, Ohio.](#)

- 2 co-authored manuscripts in review

Darren Reilly

M.S. Geology, Kent State University, April 2014

[Identification of Local Ground Water Pollution in Northeastern Pennsylvania: Marcellus Flow-back or Not?](#)

- 1 co-authored publication (Reilly *et al.*, 2015)

Mackenzie Osypian

M.S. Civil Engineering, UNC Charlotte, April 2013

[Evaluating restoration effects on transient storage and hyporheic exchange in urban and forested stream](#) (co-advised by Sandra Clinton and John Daniels)

- 1 co-authored manuscript in review

Brock Freyer

M.S. Earth Sciences, UNC Charlotte, April 2013

[Fluvial Response to River Management and Sediment Supply: Pool 6 of the Upper Mississippi River System, Southeastern Minnesota](#)

- 1 co-authored publication (Freyer and Jefferson, 2013)

Brandon Blue

M.S. Earth Sciences, UNC Charlotte, August 2012

[Seasonal Urban Stream Temperature Response to Storm Events Within the Piedmont of North Carolina](#) (co-advised by S. McMillan)

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)

- 2 publications with co-advisor

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.](#)

- 1 co-authored publication (Jefferson and McGee, 2013)

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 In Progress**

Stuart Baker M.S. Geology, Kent State University, 2013-present  
Development of Hyporheic Exchange and Nutrient Uptake Following Stream Restoration

Krista Brown M.S. Geology, Kent State University, 2013-present  
Groundwater-stream interactions and water quality characteristics of former reservoirs in northeastern Ohio

Eric Traub M.S. Geology, Kent State University, 2013-present  
The Effects of Biogeochemical Sinks on the Mobility of Trace Metals in an Area Affected By Acid Mine Drainage, Huff Run, Ohio (co-advised by David Singer)

### **Graduate Committee Membership**

Nicholas Bonini, Ph.D., Applied Geology, Kent State University, in progress  
Johnathon Kirk, Ph.D., Geography, Kent State University, in progress  
Jonathon Van Gray, Ph.D., Biological Sciences, Kent State University, in progress  
Jason Shiflet, Ph.D., Infrastructure and Environmental Systems, UNC Charlotte, in progress

Chandawimal Siriwardana, Ph.D., Applied Geology, Kent State University, 2014  
Suchismita Ghosh, Ph.D., Biological Sciences, Kent State University, 2013  
Vijaya Gagrani, Ph.D., Infrastructure and Environmental Systems, UNC Charlotte, 2012

Phil Edwards, M.S. Earth Sciences, UNC Charlotte, 2011  
Thomas Barto, M.S. Earth Sciences, UNC Charlotte, 2010  
Mary Cauthen, M.S. Earth Sciences, UNC Charlotte, 2010  
Anthony Layzell, M.S. Earth Sciences, UNC Charlotte, 2010



## Undergraduate Research Projects Supervised

Cody Unferdorfer	Kent State University Geology major, 2016, " Controls on Wetland Suspended Sediment Concentrations, West Creek Reservation, Parma, OH" <ul style="list-style-type: none"><li>• Poster at the Kent State Undergraduate Research Symposium, March 2016</li></ul>
Jillian Sarazen	Oberlin College Biology major, 2015, "The effects of antecedent soil moisture conditions on green roof runoff water quality and quantity", Ecology REU program, summer 2015. <ul style="list-style-type: none"><li>• Posters at the Kent State Water Symposium and Cleveland Metroparks Research Symposium, October-December 2015</li></ul>
Sean Robertson	Kent State University Geology major, 2014. "Soil moisture and hydraulic conductivity of bioretention cells." <ul style="list-style-type: none"><li>• Posters at the Kent State Water Symposium and Cleveland Metroparks Research Symposium, October-November 2014</li></ul>
Allison Reynolds	Kent State University Geology major, 2013-2014. "Sensitivity of precipitation isotope meteoric water lines and seasonal signals to sampling frequency and location" <ul style="list-style-type: none"><li>• Poster at the CUAHSI/USGS Laser Specs virtual workshop, February 2014</li><li>• Talk at the Geological Society of America meeting, October 2014</li><li>• 1st place at Kent State Undergraduate Research Symposium, April 2014</li></ul>
Sidney Bush	University of Virginia Environmental Science major, 2014. "Soil moisture dynamics and their effect on bioretention performance in Northeast Ohio" Ecology REU program, summer 2014. <ul style="list-style-type: none"><li>• Poster at American Geophysical Union meeting, December 2014</li></ul>
Kayla Holleman	UNC Charlotte Geology major, 2009. "Variability in precipitation isotopes on the Carolina Piedmont" <ul style="list-style-type: none"><li>• 3<sup>rd</sup> place in UNCC Undergraduate Research Fair, April 2009</li></ul>
Shawn Majors	Oregon State University Geology major, 2006. "Water chemistry of Cascades springs"

## Undergraduate Research Assistants

Cody Unferdorfer	2015-2016
Jillian Sarazen	2015
Sean Roberts	2014
Sidney Bush	2014
S. Lindsay Poluga	2012-2013
Allison Reynolds	2013-2014

Robert Q. Lewis      2010  
Kayla Holleman      2009

### **High School Research Intern**

Heather Eaken      2016

### **Professional Service**

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#### **Editing and Reviewing**

Associate Editor, Geological Society of America Bulletin, 2012-2014.

Guest Editor, Anthropocene, [Special Issue “Geomorphology of the Anthropocene”](#), 2012-2013

Reviewer for National Science Foundation (panel and ad hoc), 2008-present

Manuscript reviewer, 2006-present

Journals include Water Resources Research; Hydrological Processes; Advances in Water Resources; 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; Hydrology

#### **Professional Society Leadership**

Newsletter Editor/Webmaster, Quaternary Geology and Geomorphology Division, Geological Society of America, 2015-2017

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 2010-2013

Campus Representative, Consortium of Universities for the Advancement of Hydrologic Science, Incorporated (CUAHSI),  
Kent State University, 2013-present  
University of North Carolina, 2011-2012

#### **Conference and Short Course Organizing**

Short Course Convener, "Hands-on Experiences with Stable Isotopes in the Geosciences Curriculum", Geological Society of America Meeting, October 18, 2014

Organizing committee, Laser Specs for Field Hydrology and Biogeochemistry: A USGS-CUAHSI Virtual Workshop; 27 January to 28 February 2014

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

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

### **Session Convener**

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

- Geomorphology of the Anthropocene: The surficial legacy of past and present human activities, November 2012
- Hydrology of Urban Groundwater, Streams, and Watersheds, November 2012
- Hydrogeomorphic Processes in Hillslopes, Rivers, and Landscapes, October 2010
- Stream-Groundwater Interaction: New Understanding, Innovations, and Applications at Bedform, Reach, and River Network Scales, October 2009

Co-convenor, American Geophysical Union annual meeting, topical session:

- Water, Energy and Society in Urban Systems, December 2014

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

### **University Service**

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Department of Geology Graduate Studies Committee, 2012-present

Water Research Symposium organizing committee, 2014-2015

Architect's Stormwater Advisory Committee, 2014-present

Department of Geology Colloquium Coordinator, 2013-2014

UNC Charlotte departmental committees including two search committees, Graduate Advisory Council, MS Earth Science Committee, Mentoring Committee, 2007-2012

### **Outreach and Community Service**

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Book reviewer, EARTH magazine

“The West Without Water”, May 2014

“Blue Revolution”, June 2012

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

Twitter account @highlyanne, with 4100 followers and ~80,000 impressions / month, focused on water and geosciences topics

Media interviews and quotes on water resources and science issues, 2007-present

- People Behind the Science (podcast), 43 minute interview, January 26, 2015
- Grist (website), “How to be a science girl in a Barbie world”, December 17, 2014
- WKSU (NPR affiliate), “How flooding affects the Cuyahoga Valley National Park, and vice versa”, June 10, 2014
- Boing boing (website), “The West Virginia Chemical Spill is just one example of a much bigger problem”, January 13, 2014
- Student Science (website), "Studying rivers means wading into more than just water", October 30, 2013, 30 minute interview
- The Week (magazine), “18 complicated scientific ideas, explained simply,” February 8, 2013
- Charlotte Observer (newspaper), “Parents find [science] fun online for kids, June 5, 2011
- McClatchey News Syndicate (national newspaper syndicate), “Extreme Weather’s Frequency to Increase”, May 25, 2011
- Io9 (website), “The weirdest crop circles you’ve ever seen”, November 5, 2010
- Charlotte Now with Mike Collins WJZY (TV show), expert on drought, aired Oct. 28, 2007
- WSOC (TV station), interviewed on drought, Oct. 22, 2007
- WCCB (TV station), interviewed on drought, Oct. 22, 2007

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**

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Leshner Leadership Institute Public Engagement Fellow, American Association for the Advancement of Science, 2016-2017

First prize poster: "Hands-on Experiences with Stable Isotopes in the Geosciences Curriculum", 2014, Kent State University 21st Annual Conference Celebrating Teaching.

Inclusion in the National Association of Geoscience Teachers' [On the Cutting Edge Exemplary Teaching Activity collection](#), based on review of the “Take A Hike Assignment”, 2013,

“Strange Quark” (second place) award for Three Quarks Daily Online Science Writing contest for essay on “Levees and the Illusion of Flood Control.”, 2011. 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.

**Professional Memberships**

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American Geophysical Union, 2003-present

Geological Society of America, 2003-present

Working Group Member, “Evolving Urban-Water Systems”, International Association for Hydrological Sciences, Panta Rhei Scientific Decade, 2013-2022