

ADRIAN A. HARPOLD

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EDUCATION

- | | | |
|-------------|--|----------------|
| 1999 - 2003 | Virginia Polytechnic Institute (Virginia Tech) | Blacksburg, VA |
| ■ | B.S. in Biological Systems Engineering, <i>summa cum laude</i> | |
| 2003 - 2005 | Virginia Polytechnic Institute | Blacksburg, VA |
| ■ | M.S. in Biological Systems Engineering, thesis title: "Stream discharge measurement using a large-scale particle velocimetry prototype", advisor Saied Mostaghimi | |
| 2005 - 2010 | Cornell University | Ithaca, NY |
| ■ | Ph.D. in Biological and Environmental Engineering, dissertation title: "Hydrogeomorphological controls on stream chemistry and aquatic biota in the Catskill Mountains, New York State", advisor Tammo Steenhuis | |

RESEARCH AND TEACHING EXPERIENCE

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|----------------|--|----------------|
| 2012 - present | INSTAAR, University of Colorado and NCAR | Boulder, CO |
| | <i>Research Fellow</i> | |
| ■ | Improving representations of snow-vegetation interactions in land-surface models | |
| 2010 - 2012 | Hydrology and Water Resources Dept., University of Arizona | Tucson, AZ |
| | <i>Postdoctoral Researcher</i> | |
| ■ | Jemez River Critical Zone Observatory and impacts of pine beetles in the Rocky Mountains | |
| 2005 - 2010 | Biological and Env. Engineering Dept., Cornell University | Ithaca, NY |
| | <i>Graduate Research Fellow</i> | |
| ■ | Funded by the National Science Foundation | |
| 2003 - 2005 | Biological Systems Engineering Dept., Virginia Tech | Blacksburg, VA |
| | <i>Graduate Teaching Assistant</i> | |
| ■ | Departmental assistantship for teaching an undergraduate thermodynamics course | |
| Summer 2003 | Forestry Dept., Virginia Tech | Blacksburg, VA |
| | <i>Hydrologic Field Technician</i> | |
| ■ | Research funded by the Bureau of Land Management (BLM) collecting water quality samples | |
| Summer 2001 | Biological Systems Engineering Dept., Virginia Tech | Blacksburg, VA |
| | <i>Undergraduate Research Fellow</i> | |
| ■ | Funded by the National Science Foundation Research for Undergraduates (REU) program | |

AWARDS AND LEADERSHIP POSITIONS

- National Science Foundation EAR Postdoctoral Fellowship, 2012 - 2014
- NSF Graduate Research Fellowship, 2005 - 2009
- Virginia Conservationist of the Year, Soil and Water Conservation Society (SWCS), 2005
- President Student Chapter of SWCS, 2003 - 2004
- 2nd Place Student Poster, 2004 SWCS Meeting
- *Summa cum laude*, B.S., 2003
- NSF Research for Undergraduates Fellowship, 2002
- Virginia Tech Biological Systems Engineering Sophomore of the Year, 2002

American Geophysical Union (AGU), Critical Zone Exploration Network (CZEN), American Society of Agricultural and Biological Engineers (ASABE), Soil and Water Conservation Society (SWCS)

Alpha Epsilon Honor Society, Phi Kappa Phi Honor Society, Golden Key Honor Society, National Society of Collegiate Scholars

Engineer-in-Training (EIT) in the State of Virginia 2003, graduate of University of Aberdeen Catchment Science School 2010, participant NCAR Community Land Model course 2014

PUBLICATIONS

*** denotes student co-author**

- Harpold, A.A., Q. Guo, N. Molotch, P. Brooks, R. Bales, J.C. Fernandez-Diaz, K.N. Musselman, T. Swetnam*, P. Kirchner*, M. Meadows, J. Flannagan*, and R. Lucas*. 2014. A LiDAR derived snowpack dataset from mixed conifer forests in the Western U.S. <accepted in *Water Resources Research*>
- Harpold, A.A., J. Biederman*, K. Condon*, M. Merino*, Y. Korganokar*, T. Nan*, L.L. Sloat*, M. Ross*, and P.D. Brooks. 2014. Changes in winter season snowpack accumulation and ablation following the Las Conchas Forest Fire. *Ecohydrology*. doi: 10.1002/eco.1363.
- Harpold, A.A., P.D. Brooks, S. Rajogopalan*, I. Heidebuchel*, A. Jardine*, and C. Stielstra*. Changes in snowpack volume and snowmelt timing in the Intermountain West. 2012. *Water Resources Research*. 48:11. doi: 10.1029/2012WR011949
- AGU research spotlight in EOS Transactions 94(28). doi:10.1002/2013EO020012
- Biederman, J., P.D. Brooks, A.A. Harpold, D. Gochis, E. Gutman, D. Reed, E. Pendall, and B. Ewers. 2014. Multi-scale Observations of Snow Accumulation and Peak Snowpack Following Widespread, Insect-induced Lodgepole Pine Mortality. *Ecohydrology*. doi:10.1002/eco.1342.
- Perdrial, J. McIntosh, A.A. Harpold, P.D. Brooks, X. Zapata-Rios, J. Ray, T. Meixner, T. Kanduc, M. Litvak, P. Troch, and J. Chorover. 2014. Stream water carbon controls in seasonally snow-covered mountain catchments: impact of interannual variability of water fluxes, catchment aspect and seasonal processes. *Biogeochemistry*. doi:10.1007/s10533-013-9929-y
- Sorooshian, A.S., T.S. Shingler, A.A. Harpold, C.W. Feagles, T.M. Meixner, and P.D. Brooks. 2013. Aerosol and Precipitation Chemistry in the Southwestern United States: Spatiotemporal Trends and Interrelationships. *Atmospheric Chemistry and Physics*. 13: 7361-7379. doi:10.5194/acp-13-7361-2013
- Perdrial, J., N. Perdrial, A.A. Harpold, X. Gao, K. LaSharr, J. Chorover. 2012. Probing dissolved organic matter in the critical zone: a comparison between in situ passive capillary wick samplers (PCaps) to aqueous soil extracts. *Soil Science Society of America Journal*. 76(6): 2019-2030. doi:10.2136/sssaj2012.0061
- Chorover, J., P.A. Troch, C. Rasmussen, P.D. Brooks, J.D. Pelletier, D.D. Breshears, T.E. Huxman, S.A. Kurc, K.A. Lohse, J.C. McIntosh, T. Meixner, M.G. Schaap, M.E. Litvak, J. Perdrial, A.A. Harpold, M. Durcik. 2011. Probing how water, carbon, and energy driven landscape evolution and surface water dynamics: Jemez River Basin – Santa Catalina Mountains Critical Zone Observatory. *Vadose Zone Journal*. 10(3): 884-899. doi:10.2136/vzj2010.0132
- Harpold, A.A., D.A. Burns, M.T. Walter, and T. Steenhuis. Explaining the spatial variability of aquatic biota using watershed features in the Neversink River watershed, New York, USA. *Ecological Applications*. 23: 791-800. doi: 10.1890/12-0603.
- Harpold, A.A., S.B. Shaw, D.A. Burns, M.T. Walter, and T. Steenhuis. Relating hydrogeomorphic properties to stream buffering chemistry in the Neversink River watershed, New York, USA. 2010. *Hydrological Processes*. 24(26): 3759-3771. doi:10.1002/hyp.7802
- Harpold, A.A., S.W. Lyon, P.A. Troch, and T.S. Steenhuis. 2009. The hydrological effects of lateral preferential flow paths in a glaciated watershed in the Northeastern U.S. *Vadose Zone Journal*. 9(2): 397-414. doi:10.2136/vzj2009.0107.
- Shaw, S. A.A. Harpold, J.A. Taylor, and M.T. Walter. 2007. Investigating a high-resolution, stream chloride time series from Biscuit Brook catchment, Catskills, NY. *Journal of Hydrology*. 348(3-4): 245-256. doi:10.1016/j.hydrol.2007.10.009

- Harpold, A.A., S. Mostaghimi, P. Vlachos, K. Brannan, and T. Dillaha. 2006. Stream discharge measurement using a large-scale particle image velocimetry (LSPIV) prototype. *Transactions ASABE*. (49)6: 1791-1805.
- Wynn, T., S. Mostaghimi, J. Burger, A.A. Harpold, M. Henderson, and L.-A. Henry. 2004. Variation in root density along stream banks. *Journal of Environmental Quality*. 33: 2030-2039. doi:10.2134/jeq2004.2030

PUBLICATIONS IN PROGRESS

- Harpold, A.A., N.P. Molotch, P.D. Brooks, S.P. Burns, M. Litvak, R.K. Monson, J.R. McConnell, and K. Musselman. Snowmelt infiltration in mixed-conifer subalpine forests. <in review at *Hydrological Processes*>
- Harpold, A.A., P.D. Brooks, J. Perdrial, J. McIntosh, T. Meixner, K. Lohse, X. Zapata-Rios*, A. Rios-Vasquez*, and J. Chorover. Quantifying the variation in solute sources and nutrient cycling in montane headwater catchments. <submitted to *Water Resources Research*>
- Harpold, A.A. and N.P. Molotch. Timing of snowmelt differentially influences soil moisture response in Western U.S. mountain ecosystems. <in preparation for *Ecohydrology*>
- Harpold, A.A., M. Barlage, D. Gochis, and Q. Guo. Improving Predictions of Water and Energy Fluxes from a Land Surface Model Using. <in preparation for *Journal of Geophysical Research*>
- Vazquez-Ortega, A., J. Perdrial, A.A. Harpold, X. Zapata, C. Rasmussen, J. McIntosh, M. Schaap, M.D. Amistadi, and J. Chorover. Rare earth elements and yttrium as reactive tracers of biogeochemical weathering in the Jemez River Critical Zone Observatory. <in review at *Geochimica et Cosmochimica Acta*>
- Biederman, J.A., A.A. Harpold, D. Reed, D. Gochis, B. Ewers, E. Gutmann, and P.D. Brooks. Changes in water partitioning and runoff at the hillslope to catchment scale following insect-induced tree mortality in lodgepole pine forests. <in review at *Water Resources Research*>
- Biederman, J.A., A.A. Harpold, D. Reed, D. Gochis, B. Ewers, E. Gutmann, and P.D. Brooks. Attenuation of headwater catchment biogeochemical response to bark beetle in the riparian-stream system. <in preparation for *Biogeochemistry*>
- Broxton, P. A.A. Harpold, J. Biederman, P.D. Brooks, P.A. Troch, and N.P. Molotch. Quantifying the effects of vegetation structure on wintertime vapor losses from snow in mixed-conifer forests. <in review at *Ecohydrology*>

OTHER PUBLICATIONS

- Harpold, A.A., J.A. Biederman, and P.D. Brooks. 2013. Where did all that snow go? Compensating vapor losses following forest disturbance in the Rocky Mountains. CIRMOUNT Mountain Views. 7(1).
- Harpold, A.A. and T.S. White. Exploring the Critical Zone with LiDAR. American Geosciences Institute handout for K-12 teachers. Available at criticalzone.org/national/publications

INVITED PRESENTATIONS

- “Evaluating the Importance of Snowmelt Infiltration to Soil Water Availability Across Western U.S. Mountain Ecosystems” University of Colorado, Hydrologic Sciences Symposium, April 2014
- “Hydrologic response of headwater catchments to forest disturbance in the Rocky Mountains” University of Colorado, INSTAAR Noon Seminar, April 2013
- “Snowpack following forest disturbance: Implications for negative feedbacks on water availability” University of Colorado, Geography Dept. Colloquia, October 2012
- “Changes in snowpacks, snow melt, and streamflow in the Inter-Mountain West” Colorado School of Mines, Environmental Science Seminar. Golden, CO, October 2011
- “Changes in snowpacks, snow melt, and streamflow in the Inter-Mountain West” University of Arizona, Hydrology and Water Resources Colloquium. Tucson, AZ, November 2011
- “Using LiDAR to map snow distributions in the Valles Caldera, NM” Executive Meeting of the Board for the Valles Caldera National Preserve, Jemez Springs, NM, May 2011

SELECT CONFERENCE PROCEEDINGS

- Harpold, A.A. and N.P. Molotch. Investigating snowmelt infiltration dynamics in the western U.S. using the SNOTEL Network. AGU Fall Conference. 2013. San Francisco, CA.
- Harpold, A.A. and N.P. Molotch. Snowmelt infiltration dynamics in seasonally snow-covered areas of the Western U.S. AGU Chapman Conference. 2013. Biosphere 2, AZ.
- Harpold, A.A., N.P. Molotch, and D.R. Gochis. Doing Big Science With Big Data: Preliminary Ecohydrologic Investigations at Western CZO Sites. EarthCUBE Meeting. 2013. Newark, DE.
- Harpold, A.A., P.D. Brooks, J.N. Perdrial, J.C. McIntosh, T. Meixner, X. Zapata, and J. Chorover. Quantifying variation in solute sources in montane headwater catchments. AGU Fall Conference 2012. San Francisco, CA.
- Harpold, A.A., P.D. Brooks, J.A. Biederman, and D. Gochis. Snowpack following forest disturbance: Implications for negative feedbacks on water availability. MTNCLIM Conference 2012, Estes Park, CO.
- Harpold, A.A., P.D. Brooks and J.A. Biederman. Changes in snow accumulation and ablation following the Las Conchas forest fire, NM. CUASHI Biannual Meeting. 2012. Boulder, CO.
- Harpold, A.A., P.D. Brooks, J.A. Biederman, and T. Swetnam. Estimating catchment-scale snowpack variability in complex forested terrain. Valles Caldera National Preserve, NM. AGU Fall Conference 2011. San Francisco, CA.
- Harpold, Adrian, P.D. Brooks, J.A. Biederman, A. Somor, P. Troch, D. Gochis, E. Gutmann, H. Barnard, D. Reed, E. Pendall, and B. Ewers. Quantifying the effects of tree die-off from mountain pine beetles on hydrologic partitioning at the catchment scale. Western Water Association: MPB-Water Symposium. 2010. Boulder, CO.
- Harpold, A.A., C. Stielstra, S. Rajogopalan, I. Heidebuchel, A. Jardine, and P.D. Brooks. Changes in snowpack volume and snowmelt timing in the Intermountain West. AGU Conference 2010. San Francisco, CA.
- Harpold, A.A. Explaining the Spatial Variability in Stream Acid Buffering Chemistry and Aquatic Biota in the Neversink River Watershed, Catskill Mountains, New York State. AGU Conference. 2009. San Francisco, CA.
- Harpold, A.A. and T. Steenhuis. Conceptualizing process heterogeneity at multiple spatial scales in the Catskill Mountains, New York State, USA. EGU Conference. 2009. Vienna, Austria.
- Harpold, A.A. and T. Steenhuis. Effects of groundwater springs on spatial sources of baseflow in the Catskill Mountains, N.Y. State, USA AGU Conference. 2008. San Francisco, CA.
- Harpold, A.A. and T. Steenhuis. Overland flow caused by groundwater springs in the Catskill Mountains, New York, USA. AGU Conference. 2007. San Francisco, CA.
- Shaw, S. A.A. Harpold, and T. Walter. Investigating a high resolution, stream chloride time series from Biscuit Brook catchment, Catskills, NY. AGU Conference. 2006. San Francisco, CA.
- Harpold, A.A., H. Dahlke, and T. Steenhuis. Conceptualizing lateral flowpaths on a hillslope in the Catskill Mountains. New York. AGU Conference. 2006. San Francisco, CA.
- Harpold, A., T. Steenhuis, S. Lyon, J. Nieber, M. T. Walter and N. van de Giesen. Generalized SCS Type Equations for Distributed Runoff Generation in Ungauged, Humid Upland Watersheds. Prediction in Ungauged Basins (PUB) Workshop, Corvallis, OR.
- Harpold A.A., S. Mostaghimi, P. Vlachos. Stream discharge measurement using a large-scale particle image velocimetry prototype. AGU Conference. 2005. San Francisco, CA.
- Wynn, T., S. Mostaghimi, J. Burger, A.A. Harpold M. Henderson, and L.A. Henry. Variation in root density along stream banks. ASABE Conference. 2004. Las Vegas, NV.

PROFESSIONAL SERVICE

Journal manuscript reviewer for Water Resources Research, Hydrological Processes, Biogeosciences, Hydrogeology Journal, Hydrobiologia, Vadose Zone Journal, Transactions of ASABE, Arctic and Alpine Research, and International Journal of Climatology

Proposal reviewer for NSF

TEACHING AND STUDENT MENTORSHIP

Courses co-taught: Ecohydrology and Biogeochemistry (2011, 2012) with Paul Brooks

Graduate student mentees: J. Biederman (PhD), P. Broxton (PhD), X. Zapata (PhD), I. Heidbuchel (PhD), C. Stielstra (MS), K. Condon (MS), and A. Somor (MS).

Undergraduate student mentees: D. Stielstra (research-tech), B. Stamper (researcher), and Virginia Tech 2004 REU program advisees

SMALL GRANTS AND SCHOLARSHIPS

UNAVCO project support (2012, 2013), NSF IGERT Small Grant - Cornell (2007), The Andrew W. Mellon Research Grant - Cornell (2007), Cornell Graduate Travel Grant (2006, 2007, 2008, 2009), PUB Workshop Student Stipend Award (2006), Virginia Water Resources Grant - Virginia Tech (2004), Virginia Tech Development Program Grant (2003)

Benjamin F. Brock Scholarship (2003), George C. Vaughan Scholarship (2003), Richard L. Bidwell Engineering Scholarship (2002), John K. Anderson Scholarship (2002), Daniel & Linda Gilbert Scholarship (2001), B. L. Parsons Scholarship (2001), and North Carolina Piedmont Triad Virginia Tech Alumni Association Scholarship (2000)

MAJOR FUNDING HISTORY

NSF LiDAR Workshop	2014	\$23,237
This funding supports the development of a community workshop to improve LiDAR analysis across the Critical Zone Observatories (Principal Investigator)		

NSF Boulder Creek Critical Zone Observatory	2013 – 2014	\$3,000,000
This project supported the second round of research at Boulder Creek CZO (Senior Personnel – no salary)		

NSF Postdoctoral Research Fellowship	2012 – 2014	\$180,000
This funding supported salary and research costs for improving snow-vegetation interactions in land surface models. (Principal Investigator)		

NSF Graduate Research Fellowship	2005 – 2009	\$130,000
This project supported three years of Ph.D. research at Cornell University. (Principal Investigator)		

INTERNATIONAL EXPERIENCE

Served as a consultant to USAID for a project related to improving water management in Mali, July - August 2004

VOLUNTEER WORK

Big Brother, Big Sisters (BBBS) of Tompkins Co. NY, volunteer 2005 - 2007, BBBS of Southwest Virginia, volunteer 2003 - 2004, Apple Ridge Farm, Virginia, volunteer 2003 - 2004