

Dr. Holly R. Barnard

Assistant Professor
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Department of Geography
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Professional Interest

- Forest hydrology
- Stable isotope hydrology/ecology
- Land-use change hydrology
- Water relations tree physiology

Education

Ph.D. Forest Engineering and Forest Science, Oregon State University, Corvallis, OR, 2009.
M.S. Forest Science (Tree Physiology), Colorado State University, Fort Collins, CO, 2000.
B.S. Forest Resources (Ecosystems), University of Washington, Seattle, WA, 1998.

Honors and Awards

2007 - American Geophysical Union Horton Research Grant
2005 - Ford Foundation Pre-doctoral Fellow
2007 - Dorothy D. Hoener Memorial Fellow
2006 - James H. Dukes, Jr. Graduate Fellow
2006 - Minorities Striving and Pursuing Higher Degrees (MS PHD) in Earth Science Mentee
2005 - Dorothy D. Hoener Memorial Fellow
2004 - Oregon State University Minority Pipeline Fellow
2000 - Best Graduate Research Presentation, Front Range Student Ecology Symposium
1999 - College of Natural Resources Special Graduate
1999 - Thomas Shepherd Diversity Scholarship
1997 - Mary Gates Scholar for Undergraduate Research

Relevant Research Experience

2009 - 2010 - NSF Post-doctoral Fellow, University of Wyoming, Laramie, WY.
2004 - 2009 - PhD candidate, Oregon State University, Corvallis, OR.
2002 - 2004 - Environmental Scientist, URS Corporation, Denver, CO.
2000 - 2002 - Ecologist, USDA Rocky Mountain Research Station, Fort Collins, CO.
1998 - 2000 - Research Assistant, Colorado State University, Fort Collins, CO.
1998 - 1998 - Forestry Technician, USDA Rocky Mountain Research Station, Fort Collins, CO.
1997 - 1998 - Research Technician, Physiology and Paleoecology Laboratories, University of WA.

Certification

2004 - Certified Ecologist, Ecological Society of America

Teaching and Mentoring Experience

2007 - Co-instructor, Oregon State University, FE 538: Field Hydrology
2007 - Co-instructor, Oregon State University, FS 561: Physiology of Woody Plants
2007 - Guest Lecturer, Oregon State University, ATS 564: Interactions of Vegetation and the Atmosphere
2006 - Field Instructor, H.J. Andrews LTER, Science and Math Investigative Learning Experiences (SMILE)
2005 - Laboratory Instructor, Oregon State University, CCS 205: Soils: Sustainable Ecosystems
1998 - Laboratory Instructor, University of Washington, ESC 200: Trees and Our Environment
1997 - Teaching Assistant, University of Washington, ESC 221: Dendrology and Autecology

Undergraduates Mentored: Sierra Wolfenbarger (OSU), Daniel Grant (Whitman College), Aidan Padilla (OSU), Jessica Mandrick (Swarthmore College), Matthew Bergen (University of New Hampshire) Breandan O'Laoithe (Ireland), Eoin Kyne (Ireland)

Grants Funded

- 2008 - National Science Foundation Minority Post-doctoral Fellowship
- 2007 - American Geophysical Union, Horton Research Grant: Ecohydrological coupling in upland humid watersheds: Resolving the tree-water-streamwater paradox
- 2007 - International Atomic Energy Agency Technical Contract: Understanding ecohydrological coupling in upland humid watersheds for soil and water management
- 2007 - Richard and Doris Waring Travel Grant
- 2007 - Institute for Water and Watersheds Small Grants Program: Ecohydrology of Forested Watersheds: soil water connectivity and hydrograph separation at the HJ Andrews Experimental Forest
- 2006 - Sigma Xi Grants-in-Aid-of-Research: Illuminating the Black Box: the influence of forest transpiration on stream discharge in a small headwater catchment
- 2005 - College of Forestry International Activities Grants: Special Invited Speaker Dr. Rolf Siegwolf

Peer Reviewed Publications

Brooks, J.R., **H. Barnard**, R. Coulombe, and J. McDonnell. 2010. Ecohydrologic separation of water between trees and streams in a Mediterranean climate. *Nature – Geosciences* In Press.

Barnard, H.R., C.B. Graham, W.J. Van Verseveld, J.R. Brooks, B.J. Bond, and J.J. McDonnell. 2010. Mechanistic assessment of hillslope transpiration controls of diel sub-surface flow: a steady-state irrigation approach. *Ecohydrology* In Review.

Graham, C.B., **H.R. Barnard**, W.J. Van Verseveld, and J.J. McDonnell. 2010. Closing the Water Balance: a hillslope scale sprinkling experiment. *Hydrological Processes* In Review.

Van Verseveld, W.J., **H.R. Barnard**, C.B. Graham, J.J. McDonnell, K. Lajtha, and J.R. Brooks. 2009. A hillslope sprinkling experiment to resolve the double paradox in hydrology and bio-geochemistry. *Hydrological Processes* In Review.

Pypker, T.G., **H.R. Barnard**, M. Hauck, E.W. Sulzman, M.H. Unsworth, A.C. Mix, A. Kennedy, and B.J. Bond. 2009. Can carbon isotopes be used to predict watershed scale transpiration? *Water Resource Research* 45, W00D35, doi:10.1029/2008WR007050.

Pypker, T.G., M. Hauck, E.W. Sulzman, M.H. Unsworth, A.C. Mix, Z. Kayler, D. Conklin, A. Kennedy, **H.R. Barnard** and B.J. Bond. 2008. Toward using $\delta^{13}\text{C}$ of ecosystem respiration to monitor canopy physiology in complex terrain. *Oecologia*, 158, 399-410.

Hubbard R.M., M.G. Ryan, C.P. Giardina, and **H.R. Barnard**. 2004. The effect of fertilization on sap flux and canopy conductance in a *Eucalyptus saligna* experimental forest. *Global Change Biology* 10:427-436.

Barnard, H.R. and M.G. Ryan, 2003, A test of the hydraulic limitation hypothesis in fast-growing *Eucalyptus saligna*, *Plant, Cell and Environment*, 26, 1235-1245.

McDowell, N., **H.R. Barnard**, B.J. Bond, T. Hinckley, R. Hubbard, H. Ishii, B. Kostner, F.C. Meinzer, J.D. Marshall, F. Magnani, N. Phillips, M.G. Ryan, and D. Whitehead, 2002, The relationship between tree height and leaf area:sapwood area ratio, *Oecologia*, 132 (1): 12-20.

Binkley, D., J.L. Stape, M.G. Ryan, **H.R. Barnard**, and J. Fownes, 2001, Age-related decline in forest ecosystem growth: an individual-tree, stand structure hypothesis, *Ecosystems* 5 (1): 58-67.

Non-Peer Reviewed Publications

Barnard, H.R., W.J. van Verseveld, C.B. Graham, B.J. Bond, K. Lajtha, J.R. Brooks, J.J. McDonnell. 2007. Linking water pathways and nutrient dynamics in a small head water catchment: results of a controlled sprinkler experiment using a deuterium tracer in western Oregon. In: Proceedings: IAEA International Symposium on Advances in Isotope Hydrology and its Role in Sustainable Water Resources Management, Vienna, Austria.

Brooks, J. R., **Barnard, H.**, McDonnell, J, Burdick, C., Coulombe, R. 2007. Stable Isotopes as Indicators of Soil Water Dynamics in Watersheds. In: Proceedings: IAEA International Symposium on Advances in Isotope Hydrology and its Role in Sustainable Water Resources Management, Vienna, Austria.

Invited Presentations

- 2009 – University of Zurich, Department of Geography, Zurich, Switzerland
2009 - Chapman Conference Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions, Sun Valley, ID
2008 - Justus Liebig University Giessen, Institute for Landscape Ecology and Resource Management, Giessen, Germany
2008 - University of Wyoming, Dept. of Civil and Architectural Engineering, Laramie, WY
2007 - Simon Fraser University, Department of Geography, Hydrology Laboratory, Burnaby, Canada
2007 - Justus Liebig University Giessen, Institute for Landscape Ecology and Resource Management, Giessen, Germany

Oral Conference Presentations * indicates presenter

- “Resolving the tree-water-stream water paradox in a humid, upland catchment” (Barnard*, Brooks, McDonnell) European Geophysical Union Annual Meeting, 2008.
- “Ecohydrology in a humid watershed: a transpiration-streamflow paradox” (Barnard*, Brooks, Kayler, Sulzman, Phillips, McDonnell, Bond) American Geophysical Union Annual Meeting, 2007.
- “Controls over vegetation water use in a small watershed at varying scales of time and space” (Bond*, Kennedy, Barnard, Pypker, Czarnomski, Conklin) American Geophysical Union Annual Meeting, 2007.
- “Using the $\delta^{13}\text{C}$ of ecosystem respiration to monitor ecosystem metabolism of entire watersheds in complex terrain” (Pypker*, Hauck, Sulzman, Unsworth, Mix, Kayler, Conklin, Kennedy, Barnard, Phillips, Bond) American Geophysical Union Annual Meeting, 2007.
- “Hillslope position drives patterns of forest water relations in a steep headwater catchment” (Barnard*, Bond, Brooks, McDonnell, Kayler, Sulzman, Kennedy) Annual Meeting of the Ecological Society of America, 2007.
- “A peek inside the black box: hillslope ecohydrological responses to simulated summer rainfall in western Oregon” (Barnard*, v. Verseveld, Graham, Bond, Brooks, McDonnell) Conference of Ford Fellows, 2006.
- “Scaling of Carbon Cycle Processes in a Mountain Ecosystem Using Isotopes of Respired Carbon Dioxide in Nocturnal Cold-air Drainage” (Bond*, Barnard, Conklin, Hauck, Kayler, Mix, Phillips, Pypker, Rugh, Sulzman, Unsworth) American Geophysical Union Annual Meeting, 2006.
- “Airsheds, Isotopes, and Ecosystem Metabolism in Mountainous Terrain” (Sulzman*, Barnard, Bond, Hauck, Kayler, Mix, Pypker, Rugh, Unsworth) American Geophysical Union Annual Meeting, 2005.
- “Use of CO_2 in xylem water by foliar photosynthesis can alter foliar $\delta^{13}\text{C}$ (but not by much)” (Ryan*, Phillips, and Barnard) Annual meeting of the Ecological Society of America, 2002.
- “Testing the hydraulic limitation hypothesis in fast-growing *Eucalyptus saligna*” (Barnard* and Ryan) IUFRO Canopy Processes Meeting, 2001.
- “Canopy conductance and leaf gas exchange in *Eucalyptus saligna* trees of different heights” (Barnard* and Ryan) ESA Annual Meeting, 2000.
- “A single-tree approach to age-related decline in stand growth” (Binkley*, Ryan, and Barnard) Annual meeting of the Ecological Society of America, 2000.
- “Hydraulic limitation hypothesis: necessary conditions” (Barnard*) ESA Annual Meeting, Discussion: What DOES cause age-related decline in forest productivity? 2000.
- “Whole tree conductance and leaf gas exchange in *Eucalyptus saligna* trees of different heights” (Barnard* and Ryan) Front Range Student Ecology Symposium, 2000.
- “Variation in foliage biomass in fertilized and unfertilized Douglas-fir: Comparison of two methods” (Barnard*, Hinckley, and Shen) ESA Annual Meeting, 1998.

Conference Poster Displays

“Linking water pathways and nutrient dynamics in a small head water catchment: results of a controlled sprinkler experiment using a deuterium tracer in western Oregon” (Barnard, v. Verseveld, Graham, Bond, Lajtha, Brooks, McDonnell), International Atomic Energy Agency, International Symposium on Advances in Isotope Hydrology and its Role in Sustainable Water Resources Management, 2007.

“Ecohydrology of the HJ Andrews Experimental Forest: exposing patterns and processes” (Barnard et al.), National Science Board Meeting, February 2007.

“Opening the Black Box: Hillslope Ecohydrological Responses to Simulated Rainfall in Western Oregon” (Barnard, v. Verseveld, Graham, Bond, Brooks, McDonnell), American Geophysical Society Meeting, 2006.

“Conifer transpiration shows little response to simulated summer rainfall: results of an experimental test using a deuterium tracer in western Oregon” (Barnard, v. Verseveld, Graham, Brooks, Bond, McDonnell), LTER All Scientist Meeting, 2006.

“Hillslope Scale Ecohydrological Processes: The 2005 Watershed 10 Hillslope Sprinkling Experiments” (Barnard, Graham, v. Verseveld, Bond, Brooks, Lajtha, McDonnell) HJ Andrews, LTER Symposium, 2006.

Professional Service and Leadership Activities

Reviewer: Ecological Applications, Plant and Soil, Hydrological Sciences Journal, Benchmark Papers in Hydrology, Journal of Forest Research, Water Resources Research

- 2009 - Session Convener: Tracers, Isotopes and Other Biogeochemical Techniques in Ecohydrology, American Geophysical Union Meeting
- 2008 - Session Convener: Hydrologic Controls on Ecosystem Function, American Geophysical Union Meeting
- 2008 - Search Committee Member, Oregon State University, Department of Forest Engineering
- 2006 - Steering Committee Member, OSU Community and Diversity Black Initiative
- 2005 - Graduate Student Representative, HJ Andrews Long-Term Ecological Research (LTER)
- 2005 - President, Black Graduate Student Association, Oregon State University
- 2005 - Search Committee Member, Oregon State University, Department of Forest Science

Professional Memberships:

Ecological Society of America (since 1998), American Geophysical Union (since 2004), Phi Kappa Phi (inducted 2007), Sigma Xi (inducted 2006), Xi Sigma Pi (inducted 1999)