

National Needs Fellowships

2005-38420-15809: **Multidisciplinary training in ecohydrology for addressing national watershed needs** (4 PhD)

2007-38420-17775: **Ecohydrological training to address semiarid forest ecosystem health and restoration** (5 MS)

Faculty and University Affiliations: David D. Breshears¹, Paul. D. Brooks², D. Phillip Guertin¹, Travis E. Huxman³, Shirley A. Kurc¹, Kathleen A. Lohse¹; ¹*School of Natural Resources (College of Ag & Life Sci)*, ²*Hydrology & Water Resources (College of Engineering)*, and ³*Ecology & Evolutionary Biology (College of Sci.)*. Additional information: daveb@email.arizona.edu or http://www.cals.arizona.edu/snr/research/wr/breshears/USDA_training.htm.

USDA needs being addressed: Natural Resources, Watershed Management, Forest Ecosystem Health and Restoration, Riparian Restoration, Water Security, Water Quality and Quantity, Agricultural Management, Contaminant Assessment

Approach: Interdisciplinary emphasis on emerging area of ecohydrology; cross-campus participation from three Colleges; seminar focusing on developing professional vision and communication and leadership skills, based on *The Seven Habits of Highly Effective People*; active involvement in professional meetings; PhD Fellows provide additional mentoring for MS Fellows; diverse set of ties to USDA issues.

Metrics of success:

Fellow Selection and Inclusion of Under-represented Groups: Selection of Fellows is 100% complete for the PhD program and 80% complete for the MS, with the remaining MS Fellow currently being finalized and processed. Currently enrolled Fellows include participation by under-represented groups (50% female, 25% Hispanic/Latino; first-generation students are also included).

Program Progress: All USDA Fellows that began by August 2007 have 1) completed the interdisciplinary course "Dryland Ecohydrology and Vegetation Dynamics", 2) completed "Personal Vision, Leadership, and Communication Skills for Environmental Scientists", 3) coordinated with committee members, 4) initiated research, and 5) demonstrated early success through professional presentations, awards, communication and outreach activities (see *table of Fellows*). All Fellows indicated that the core classes taught them to think in new ways.









Completed and Pending Student Presentations at Professional Meetings: American Geophysical Union; Arizona Chapter – Society for Range Management; Colorado Plateau Conference; Ecological Society of America; International Conference on Aeolian Research; Research Insights on Semiarid Ecosystems; SW Fire Conference; SW Section - Association of Photogrammetry and Remote Sensing; Soil and Water Conservation Society

Other examples of leadership and professional experience and recognition: Public lectures at Biosphere 2; technical and executive roles within local community groups and NGOs (rainwater harvesting, water quality); research ties that include involvement with K-12 education; organization of and participation in special sessions at national professional meetings; international and travel awards; and awards for best research for competitions within UA

Sources of additional funding: Includes Agricultural Research Service, Arizona Water Institute, Biosphere 2, Department of Energy, University of Arizona, and National Science Foundation



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	Fellows	Dept. / Degree	Advisor	Research Topic	USDA Applications	Leadership and Communication Highlight
	Henry Adams	EEB PhD	Travis Huxman (co-advisor Dave Breshears)	Forest dieoff: Experimental determination of how warmer drought triggers dieoff	Research tied to extensive USDA woodlands	Regular public presentations at Biosphere 2 in association with ongoing research
	Jared Buono	SNR PhD	Phil Guertin	Overland flow hydraulics: Identifying the effects of vegetation change on flow velocity and pattern	Working directly on ARS research project	Co-founded a community development and conservation nonprofit
	Lisa Benton	SNR MS	Shirley Kurc	Automated method for monitoring plant phenology: Developing method relating plant phenology ("green-up" and timing of bloom events) to automated camera system	System targeted for use in growing US National Phenology Network that will include extensive USDA lands	Integrating research with K-12 through school involvement in research
	Jennifer Davison	SNR MS	Dave Breshears	Detection of forest change via remote sensing: Development of remote sensing approaches to use Sky Islands as barometers of vegetation change	Includes numerous USDA Sky Island gradients that are being impacted simultaneously by restoration, drought, and fire	Presenting invited talk at upcoming special session at national ESA
	Jason Field	SNR PhD	Dave Breshears	Wind and water erosion: Field measurements comparing wind and water in response to disturbance	Research on historic USDA site, applicable to extensive USDA lands, and bridges work between different ARS groups	Lead organizer for upcoming special session at national ESA meeting
	Erika Gallo	HWR PhD	Paul Brooks	Urban runoff water quality: Assessment of land use impacts on urban runoff biogeochemistry, including effects of forested riparian areas on solute fate and transport	Addressing nutrient and pollutant loading from multiple types of land use, including urban USDA study watersheds using USDA's AGWA model	Professional presentation of initial results at national AGU meeting
	Rebecca Lloyd	SNR MS	Kathleen Lohse	Forest restoration, ecohydrology, and roads: Assessment of how removing high densities of forest roads restores ecosystem ecological and hydrological function.	Research via a restoration partnership between Nez Perce Tribe and USFS and provides direct feedback to restoration program.	Ongoing role in inter-agency land management, including national presentations directed at land managers
	Patrick Royer	SNR MS	Dave Breshears	Forest microclimate and evaporation: Assessment of effects of changing tree cover in woodlands and forests due to climate, drought, fire and thinning	Research on USFS and private lands on the two predominant woodland and forest types of western US	Participation in regional network coordinating impacts of drought on SW woodlands and forests (DIRE-Net)

