Sandra "Sam" Litschert, Ph.D.

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Qualifications

- Sixteen years' combined education and experience in GIS analysis, specializing for seven years in spatiotemporal development and visualization.
- Geospatial and physical scientist with creative research and problem-solving skills.
- Web front end developer with some UX/UI
- Proficient in GUI development, technical writing, technical support, and training.
- Able to collaborate and communicate effectively with other scientists and lay people.

Software Skills

ESRI ArcGIS v 7.x to 10.x (Spatial Analyst, 3D Analyst, and Editor)
Python (ArcPy, NumPy, MatPlotLib, PyQt)
ENVI and Erdas Imagine
JavaScript, HTML5, CSS (learning in WebLab, 2014)
R statistical software
Microsoft Office Suite including Access database

Professional Experience

April 2014-present: Geospatial contractor, Fort Collins, CO

- Tested and ran wood loading models that were formerly developed at Earth Systems Institute (see below);
- Contributed to manuscript describing wood models.

March 2010 – March 2014: Staff Scientist/Programmer, NetMap Applications, Earth Systems Institute, Mount Shasta/Seattle

- Designed and implemented new spatiotemporal applications including science-based surface erosion, fish habitat, and multi-scale wood loading models using Python and ArcPy, VB.net/ArcObjects:
- Used R to develop fish presence/absence and piscicide models;
- Supervised a student intern in collaboration with ColoradoView to model estuarine ecology and habitat using Landsat 8 data in ENVI:
- Designed queries and reports using NRCS soils data in MS Access database;
- Developed quality control programs for geospatial data (Python stand-alone);
- Collaborated with other scientists and agency employees;
- Trained users on NetMap applications;
- Provided GIS technical support for staff and clients;
- Presented at science conferences;
- Wrote technical documents for GIS processes, decision support tools, and GIS data sets;
- Developed a Python script to help automate metadata creation to FGDC standards.

Jan 2009 – February 2010: Postdoctoral Researcher, Colorado State University (CSU), Fort Collins, CO

The research project was to model the effects of climate change on wildfire and erosion in the Southern Rockies Ecoregion using GIS. Specific tasks included:

- Developed methods to solve the research questions;
- Collated and developed GIS data for wildfire, vegetation/land use, and climate projections;
- Developed and coded a rainfall erosivity method that incorporated climate change in GIS;

- Implemented Python scripts to calculate soil loss using RUSLE model;
- Developed and implemented workflows for Monte Carlo simulations of wildfire;
- Calculated statistics and burned area model with R;
- Published 2 papers in peer reviewed journals.

February 2001-January, 2009: Warner College of Natural Resources, CSU, Fort Collins, CO
Summary of positions and tasks:

- ***Instructor***: GIS Methods for Resource Management, Natural Resources Ecology and Measurements,
- ***Graduate teaching assistant:*** Watershed Problem Analysis, Concepts in GIS, Land use hydrology.
- ***Graduate research assistant***: Modeled erosion, changes in runoff, landslide risk using readily available data and imagery, and methods including genetic programming, cluster analysis, deterministic and stochastic. Fieldwork involved use of Garmin GPS (including design and set up of data dictionary and post-process data to GIS), inclinometer, and laser total station for measuring gullies, hillslope gradients, and stream cross sections.
- ***Web Designer***: Researched, designed, and implemented website in Dreamweaver for the Watershed Science Program (now merged with the Department of Ecosystem Science and Sustainability).

September 2000 – January 2001: Remote Sensing/GIS Technician, i-cubed, Fort Collins, CO

- Developed GIS layers for RUSLE erosion model from imagery.

July 2000 – September 2000: Technical Liaison, CADI, Jakarta, Indonesia

- Created database of GIS data layers and tables from existing water resources projects;
- Wrote technical reports;
- Managed liaison between local workers and team leader for a GIS project.

September 1999-January 2000: Student Coordinator, Flash Flood Lab, CSU, CO

- Developed survey and MS Access database schema;
- Designed and implemented website in HTML.

Jan 1998 - August 1999: GIS Technician, El Paso County Planning Dept., Colorado Springs, CO

- Edited GIS layers and databases for new subdivision development;
- Provided GIS technical support;
- Developed MS Access database to query and report county surveys on land use and zoning;
- Developed a series of maps to illustrate county master plans.

Education

Ph.D. Earth Sciences, specialization in Watershed Sciences, 2009. CSU, Fort Collins, CO
Dissertation Title: *Predicting Cumulative Watershed Effects in Small Forested Watersheds.*

M.S. GIS/Remote Sensing (Forest Sciences), 2002. CSU, Fort Collins, CO
Thesis Title: *A comparison of genetic programming and linear discriminant analysis to identify regions at risk for landslides.*

B.A. Geography and Environmental Studies, with a minor in Computer Science 1998. Graduated magna cum laude. University of Colorado at Colorado Springs, CO.

Continuing Education

- Weblab: a web design and development boot camp, Front Range Community College (June-September 2014)
- OpenGeo Suite: Introduction to PostGIS and Geoserver (April, 2014)
- Exelis Envi Understanding and exploring Landsat 8 in ENVI (2013)

Professional affiliations

GIS-Colorado, Association of American Geographers, American Water Resources Association, American Geophysical Union.

Volunteer Experience

- GIS Colorado Scholarship Committee, 2014
- Technical advisor (2006-2009) and crew leader (1997-2009) for Volunteers for Outdoor Colorado
  - Trained, led, and motivated teams of volunteers
  - Designed trail and restoration projects
- AmeriCorps program 1997-8
  - Edited GIS database for El Paso County Planning
  - Designed a series of maps to illustrate County Master Plan
  - Collaborated with Las Animas County personnel to research and design new school districts
- Water Docent, "Keepers of the Water" program, Beidleman Environmental Center, Colorado Springs, 1997.

Publications, Presentations & Posters, Reports

Publications

Benda L and Litschert SE (In prep). Modeling the effects of forest management on wood recruitment - a multiscale design.

Litschert SE, Theobald DM, Brown TC, 2014. Effects of climate change and wildfire on soil loss in the Southern Rockies Ecoregion. Catena 118: 206-219.

Litschert SE, Brown TC, Theobald DM, 2012. Historic and future wildfire extent in the Southern Rockies Ecoregion. Forest Ecology and Management Forest Ecology and Management 268: 124-133 doi:101016/jforeco201112024

Litschert SE and MacDonald LH, 2009. Frequency and characteristics of Sediment Delivery Pathways from Forest Harvest Units to Streams. Forest Ecology and Management, doi:10.1016/j.foreco.2009.09.038.

Litschert SE, 2004. Landslide Hazard Zoning Using Genetic Programming. Physical Geography 25(2): 130-151.

Presentations & Posters

Fuller, J, Litschert, S, and Ownby, C, 2013. Estuarine habitat mapping in Southeast Alaska. GIS in the Rockies, Denver, CO (Poster).

Benda, L and Litschert S, 2013. NetMap desktop watersheds and analysis tools. Ecology and Active Management of Riparian Vegetation in Forested Landscapes, North California Society of American Foresters, Webinar.

Litschert, S and Benda, L, 2012. Wood recruitment modeling in NetMap (or how to see the wood for the trees). Science of Riparian Thinning Workshop, Corvallis, OR.

Litschert, S and Benda L, 2012. NetMap geospatial data and tools: Case study of an inundation and habitat model. Northern Colorado GIS User Group, Loveland, CO.

Litschert, S and Benda, L, 2012. NetMap tools and digital watersheds: community solutions for natural resources management and research. GISCO Summer Meeting, Steamboat Springs, CO.

Litschert SE, Theobald DM, and Brown TC, 2010. Effects of climate change and fire on sediment in the Southern Rockies Ecoregion. American Geophysical Union (AGU), CA (Poster).

Litschert SE, Brown TC, and Theobald DM, 2010. Historic and future wildfires in the Southern Rockies Ecoregion, USA. Geological Society of America, CO.

Litschert SE and MacDonald LH, 2009. Evaluation and sensitivity analyses of the cumulative watershed effects models: Delta-Q and FOREST. International Landscape Ecology Association, UT (Poster),

Litschert SE and MacDonald LH, 2007. Modeling changes in hydrology and sedimentation for forested watersheds: an approach for land managers. *Eos. Trans. AGU*, Fall meeting supplement, abstract H31F-0723 (Poster),

Litschert SE and MacDonald LH, 2006. Delta-Q and FOREST: spatially explicit tools for predicting cumulative watershed effects. American Water Resources Association, MT.

Coe D and Litschert SE, 2005. Erosion in the American River Watershed. American River Conference, CA.

Litschert SE and MacDonald LH, 2004. Connectivity of timber harvest units to the stream network in the Sierra Nevada, California. *Eos. Trans. AGU*, Fall meeting supplement, Abstract H 51B (Poster),

MacDonald LH and Litschert SE, 2004. Predicting cumulative watershed effects using spatially explicit models: DeltaQ and FOREST. *Eos. Trans. AGU*, Fall meeting supplement (Poster),

MacDonald LH, Litschert SE, and Coe D, 2002. Developing a Spatially Explicit Model to Predict Changes in Runoff and Sediment Yield in the Central Sierra Nevada. Sierra Nevada Science Symposium, CA (Poster).

Litschert SE and Dean D, 2001. A Comparison of Genetic Programming and Linear Discriminant Analysis to Identify Regions at Risk for Landslides". INFORMS, Miami, FL.

Litschert SE and Dean D, 2000. Identifying Regions at Risk for Landslides Using GIS and Genetic Programming. Southern Forestry GIS (SOFOR), Athens, GA (Poster).

Conference Proceedings and Reports

Benda L. and Litschert S, 2014. Erosion, sediment sources, and channel analysis in the Crystal River, Colorado.

MacDonald LH, Coe D, and Litschert SE, 2004. Assessing Cumulative Watershed Effects in the Central Sierra Nevada: Hillslope Measurements and Catchment-Scale Modeling, pp 149-157. IN Murphy, DD and PA Stine Editors. 2004. Proceedings of the Sierra Nevada Science Symposium; 2002; Kings Beach, CA; Gen. Tech. Rep. PSW_GTR-193. Albany, CA. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 287p.

Litschert, Sam and Denis J. Dean. 2000. Identifying Regions at Risk for Landslides Using Combined GIS and Genetic Algorithm Procedures. 7 page document in: Proceedings for the 3rd Southern Forestry GIS Conference (William G. Hubbard and J. B. Jordin, editors). Athens, Georgia. Published as a CD.