Zachary L. Langford

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Education

Ph.D. Energy Science and Engineering, The University of Tennessee (*2014–Present*)
M.S. Civil Engineering, Pennsylvania State University–University, Park 2013
B.S. Earth System Science, University of Alabama in Huntsville 2011

Interests

Satellite remote sensing, environmental modeling, LiDAR and Radar, microwave and hyperspectral imagery, multivariate statistics, high performance computing, processing and analysis of big data.

Research

Current
2014–Present

Research Assistant at Oak Ridge National Laboratory
Applying multivariate data mining methodologies of high resolution satellite imagery (∼2 m) for landscape characterization, yielding useful metrics for indicating the representativeness of sites, measurements, and model parameters.

2011–2013

Research Assistant at Pennsylvania State University
Utilized high resolution panchromatic & multispectral satellite imagery (QuickBird, WorldView-2, and GeoEye) to characterize soil moisture profiles in the McMurdo Dry Valleys, Antarctica.

2010–2011

Research Assistant at University of Alabama in Huntsville
Collaborated with NASA's Regional Visualization and Monitoring System (SERVIR) and Smithsonian Tropical Research Institute to integrate satellite and other geospatial data to support environmental monitoring in Central America.

Awards and Honors

2015 University of Alaska–Fairbanks/NSF: Travel Grant for Environmental Modeling Workshop
2014 ORNL/UTK: Energy Science and Engineering Fellowship
2011 UAH: Travel Grant for International Astronautical Congress, South Africa
2010 UAH: Research and Study Abroad in Panama City, Panama
2010 STRI: Smithsonian Tropical Research Institute Short Term Fellowship (declined)

Skills

Programming: Python, C, Shell-Script, html, Learning MPI
Softwares: unix/Mac/Linux, Matlab, GRASS/GDAL,ENVI/IDL, LaTeX, vim

Publications

Thesis

1. **Langford, Zachary L.** (2013). Are the Dry Valleys Getting Wetter? A Preliminary Assessment of Wetness Across the Mcmurdo Dry Valleys Landscape. Pennsylvania State University, 131 p.

Journals

1. **Langford, Zachary L.**,Michael Gooseff, and Derrick Lampkin (2015). Spatiotemporal dynamics of wetted soils across a polar desert landscape. *Antarctic Science*, 27, pp. 197 – 209, doi:10.1017/S0954102014000601.

Conference Proceedings

1. **Langford, Zachary L.**, Casey Calamaio, and Robert Griffin. "Socio-Environmental Impacts of Land Cover Change in the Panama Canal Watershed." International Astronautical Congress, Cape Town, South Africa, IAC-11,B1,5,3,x11474.
2. **Langford, Zachary L.**, Casey Calamaio, and Robert Griffin. "Protecting the Panama Canal Watershed through the Exchange of Geospatial Data." International Astronautical Congress, Cape Town, South Africa, IAC-11,B1,6,6,x11496.

Preparation and Review

3. **Langford, Zachary L.**, Jitendra Kumar, Forrest M. Hoffman, Victoria Sloan, Richard Norby, and Stan Wullschleger. Mapping plant functional type distributions in Arctic ecosystems using WorldView-2 satellite imagery and unsupervised clustering. In-Preparation.
2. **Langford, Zachary L.**,Michael Gooseff, and Derrick Lampkin. Satellite-based estimates of soil moisture using an artificial neural network across a polar desert landscape. In-Preparation.
1. Casey Calamaio, Robert Griffin, and **Langford, Zachary L.** Historical land cover change in the Panama Canal watershed. In-Preparation.

Abstract/Posters in Conferences

1. **Langford, Zachary L.**, Jitendra Kumar, Forrest M. Hoffman, Victoria Sloan, Richard Norby, and Stan Wullschleger. "Mapping Plant Functional Type Distributions in Arctic Ecosystems Using WorldView-2 Satellite Imagery and Unsupervised Clustering." December 18, 2014. 2014 American Geophysical Union (AGU) Fall Meeting (December 15–19, 2014), San Francisco, California, USA. Abstract B41I-0166.
2. Kumar, Jitendra, **Langford, Zachary L.**, Fengming Yuan, and Forrest M. Hoffman. December 19, 2014. "Remote Sensing to Inform Plant Functional Type (PFT) Distributions in the Community Land Model." 2014 American Geophysical Union (AGU) Fall Meeting (December 15–19, 2014), San Francisco, California, USA. Abstract B53I-03. Invited.
3. Hoffman, Forrest M., Jitendra Kumar, Damian Maddalena, **Langford, Zachary L.**, and William W. Hargrove. December 18, 2014. "Multivariate Spatio-Temporal Clustering: A Framework for Integrating Disparate Data to Understand Network Representativeness and Scaling Up Sparse Ecosystem Measurements." 2014 American Geophysical Union (AGU) Fall Meeting (December 15–19, 2014), San Francisco, California, USA. Abstract IN44A-06. Invited.
4. Hoffman, Forrest M., Jitendra Kumar, William W. Hargrove, **Langford, Zachary L.**, Damian Maddalena, William J. Riley, and James T. Randerson. October 29, 2014. "Integrating Earth Science Research through Model, Experiment, and Data Synthesis."U.S. Department of Energy

Green Ocean Amazon (GOAmazon) Joint Principal Investigators Meeting, Woodrow Wilson International Center for Scholars, Washington, DC, USA.

5. Hoffman, Forrest M., Jitendra Kumar, **Langford, Zachary L.**, Damian Maddalena, Nathan Collier, Victoria Sloan, Richard T. Mills, and William W. Hargrove."Representativeness-Based Sampling Network Design and Scaling Strategies for Measurements in Arctic and Tropical Ecosystems." U.S. Department of Energy Joint Terrestrial Ecosystem Science and Subsurface Biogeochemistry Research Principal Investigator Meeting, Potomac, Maryland, USA; May 2014
6. **Langford, Zachary L.**,Michael Gooseff, and Derrick Lampkin. "Characterizing spatiotemporal dynamics of wetted soils across a polar desert landscape, McMurdo Dry Valleys, Antarctica." American Geophysical Union Fall Meeting, San Francisco, CA USA; December 2012.
7. **Langford, Zachary L.**,Michael Gooseff, and Derrick Lampkin. "Characterizing spatiotemporal dynamics of wetted soils across a polar desert landscape, McMurdo Dry Valleys, Antarctica." LTER All Scientists Meeting, Estes Park, CO, USA; September 2012.
8. **Langford, Zachary L.**,Michael Gooseff, and Derrick Lampkin. "Characterizing spatiotemporal dynamics of wetted soils across a polar desert landscape, McMurdo Dry Valleys, Antarctica." XXXII SCAR and Open Science Conference, Portland OR, USA; July 2012.

Academic Service

Reviewer for: International Journal of Remote Sensing | (2014)

Memberships

American Geophysical Union
International Association for Landscape Ecology

Other Interests and Activities

Lowering ecological footprint, Open-Source Software, Lifting Weights, Philosophy

References

Dr. Jitendra Kumar, Environmental Sciences Division, ORNL
Mr. Forrest Hoffman, Computer Science & Mathematics Division, ORNL
Dr. Michael N. Gooseff, Civil and Environmental Engineering, Colorado State University

Last updated: March 27, 2015