# 2011 Oregon Coastal LiDAR Meeting

May 11, 2011: 9:00 am – 4:00 pm

Guin Library Seminar Room, Hatfield Marine Science Center, Newport, OR

## Agenda

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| 9:00 am – 9:15 am: | Introduction and Welcome |
| 9:15 am – 9:45 am: | Ian Madin (DOGAMI) – Getting the most out of your LiDAR data |
| 9:45 am – 10:30 am: | John Sharrard (ESRI) – Best practices for working with LiDAR data in ArcGIS |
| 10:30 am – 10:45 am: | BREAK |
| 10:45 am – 11:15 am: | Neal Myers (Central Lincoln People's Utility District) – LASTools Overview |
| 11:15 am – 12:00 pm: | Doug Smith (David C. Smith & Associates, Inc.) – LiDARgrammetry: lessons learned from the Columbia River LiDAR Project |
| 12:00 pm – 1:00 pm: | LUNCH |
| 1:00 pm – 1:45 pm: | Demetrios Gatziolis (USFS) – LiDAR-assisted terrain and vegetation profile challenges in the coastal Pacific Northwest |
| 1:45 pm – 2:15 pm: | Russ Faux (Watershed Sciences) – Airborne LiDAR Data in coastal environments: considerations for acquisition, data development, and feature extraction |
| 2:15 pm – 2:30 pm: | BREAK |
| 2:30 pm – 3:15 pm: | Randy Dana (OR Coastal Management Program) – Creating tide stage lines from LiDAR and VDatum |
| 3:15 pm – 3:45 pm: | John Bauer (Wetlands Conservancy) and Laura Brophy (Green Point Consulting) – Mapping tidal wetlands using LiDAR and field data collection |
| 3:45 pm – 4:00 pm: | Closing |

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# Presentations

### Getting the most out of your LiDAR data                                   9:15-9:45
Ian Madin, Oregon Department of Geology and Mineral Industries

Abstract:
High resolution, high accuracy public domain LiDAR is becoming available for large parts of Oregon. Getting the most out of this rich and massive data set often requires new techniques. Points can be viewed directly in simple programs like the USFS Fusion program, or combined with other GIS data in ArcScene. Bare earth grids can be visualized in many ways beyond the traditional hillshade view to increase the ease of interpretation. Ultra-high resolution grids can be made in ArcMap directly from points, and Fusion can be used to select subsets of the points for detailed analysis. All of these techniques will be briefly reviewed.

About the Presenter:
Ian Madin has a BA in Geology from UC Berkeley (1980) and an MS in Geology from Oregon State University (1986), where he studied active tectonics in the Pakistani Himalaya and New Zealand.  He joined the Oregon Department of Geology and Mineral Industries in 1987 as the Seismic Hazard Geologist for the State of Oregon, and served in that position until 1994 when he was transferred to the Baker City field office of DOGAMI.  After 4 years in Baker City making geologic maps, he returned to the Portland office of DOGAMI as the geologic mapping team leader, and in 2004 became Chief Scientist for the agency.  He is a member of the American Geophysical Union, Geologic Society of America and is a Registered Professional Geologist.

### Best practices for working with LiDAR data in ArcGIS                        9:45-10:30
John Sharrard, ESRI

Abstract:
Learn the best practices for working with LiDAR data in ArcGIS. This will include a review of some of the new imagery tools introduced at version 10.  We'll also take a peek into the significantly increased support for LiDAR coming in version 10.1 scheduled for release in Q4 of this year.

About the Presenter:
John Sharrard graduated from Oregon State University (Geography/GeoSciences) and has been working in the GIS field for 23 years.   The last 17 years have been with ESRI as a GIS Solutions Engineer.

### LasTools Overview                                                          10:45-11:15
Neal Myers, Central Lincoln People's Utility District

Abstract:
LasTools provides the tools required to generate DSMs and DTMs from raw or basically preprocessed LiDAR data in a standalone application.  It features intelligent management of project data, import and geocoding of raw LiDAR and image data, system calibration, filtering and classification of LiDAR data, generation of elevation models, and the export of the results in various common formats.

About the Presenter:
Neal Myers has worked in CAD and GIS for local government and utilities for over 20 years spanning numerous technologies.

### LiDAR-grammetry:  Lessons Learned from the Columbia River LiDAR Project     11:15-12:00
Doug Smith, David C. Smith and Associates, Inc.

Abstract:
Overview of methodology used and lessons learned for the photogrammetric quality control component of the Columbia River LiDAR project.  This project included high density LiDAR for over 2800 square miles of the Columbia River 500 year flood plain corridor and major tributaries.  Photogrammetric review and edit of

stereograms generated from LiDAR intensity data (often called "LiDARgrammetry") played a critical role in the project and was used for the quality control review of the data, detailed 3D delineation of water boundaries and addition of supplemental breaklines to model cliffs and other rough terrain not represented by the ground model.  These value added tasks were needed to enhance the standard LiDAR deliverables for an additional level of detail and accuracy needed to support the Army Corps of Engineers intended floodplain modeling work.

About the Presenter:
Doug Smith is a consulting photogrammetrist and Vice President of David C. Smith and Associates, Inc., a photogrammetric mapping firm located in Portland Oregon.  Doug is a registered professional engineer, professional photogrammetrist and certified photogrammetrist with fifteen years of experience in photogrammetric mapping, including several projects in recent years involving using photogrammetry methods to review and supplement air-borne and mobile scanning LiDAR data.

**LiDAR-assisted terrain and vegetation profile challenges in the coastal Pacific Northwest**      1:00-1:45
Demetrios Gatziolis, US Forest Service

Abstract:
LiDAR technologies have become increasingly popular in the assessment of physiographic parameters, vegetation structure and conditions, and the derivation of terrain and object surfaces. However, experience suggests that many users are not fully aware of limitations and challenges that characterize LiDAR data acquisitions, and of how those affect data analysis procedures and the accuracy and precision of derived information layers. Owing to unconventional terrain and vegetation conditions prevalent in the coastal Pacific Northwest, LiDAR derivatives may exhibit often undetected artifacts, whose origin and magnitude are discussed along with suggestions on how they can potentially be mitigated.

About the Presenter:
Dr. Demetrios Gatziolis has a B.S in Forestry from Aristotle University of Thessaloniki, School of Forestry, Macedonia, Greece (1991), an M.Sc. in Geographic Information Science, Michigan State University, Dept of Forestry (1999), and a Ph.D. in Remote Sensing, Michigan State University, Dept of Forestry (2003).  Dr. Gatziolis is a Research Forester for The Forest Service, PNW Research Station, Portland, Oregon.

**Airborne LiDAR Data in Coastal Environments:  Considerations for Acquisition, Data Development, and Feature Extraction**      1:45-2:15
Russ Faux, Watershed Sciences, Inc.

Abstract:
Over the past five years, Watershed Sciences, Inc. has collected high resolution LiDAR data for the Northwest coastline with significant coverage from Northern California to British Columbia.  Considerations for coastal data acquisition include the variability in marine weather and the dynamics of tidal zones.  These factors impact not only mission planning and timing, but also data calibration and development of deliverables. In this presentation, we will discuss some of these considerations in the context of recent acquisitions in Oregon and Washington.  In addition, we will examine the development of data products such as stream networks, building features, and vegetation analysis that extend beyond the standard bare earth digital elevation model.

About the Presenter:
Russell Faux is a Principal at Watershed Sciences, Inc. based in Corvallis, OR.  Watershed Sciences is an airborne remote sensing company that has provided LiDAR deliverables for millions of acres in Oregon and Washington under contract with the Oregon LiDAR Consortium and Puget Sound LiDAR Consortium.  Mr. Faux holds a B.S. in Electrical Engineering from Penn State and an M.S. in Bioresource Engineering from Oregon State University.

**Creating Tide Stage Lines From LiDAR And VDatum** 2:30-3:15
Randy Dana, Oregon Coastal Management Program

Abstract:
LiDAR data collected for the Oregon coast provides accurate bare-earth digital elevation models of the land/sea interface. NOAA's VDatum tool provides good approximations for the elevation of various tide stages along the outer coast and lower estuaries. A scripted process brings these two data sets together to produce vector representations of specific tide stages, where the source data permit. Discussion will include methods to compare lidar flight times to recorded tide heights to estimate for which tide stages useful vector results may be produced.

About the Presenter:
Randy Dana serves as GIS analyst and coordinator for the Oregon Coastal Management Program.  He has worked for the Program for 16 years.

**Mapping tidal wetlands using LiDAR and field data collection** 3:15-3:45
John Bauer, Wetlands Conservancy
Laura Brophy, Green Point Consulting

Abstract:
LiDAR products have greatly enhanced wetland mapping, yet their full potential has not been realized. Bauer will briefly discuss a perceived data need for estuary and freshwater wetland mapping: Where is the water? Can lidar data be processed to delineate the land/water interface? Applications include more efficient integration of lidar-derived elevation data with existing bathymetry datasets.

Coastwide LiDAR data provides a powerful new tool for mapping current and historic tidal wetlands as well as the "landward migration zone" -- that area that may become tidal wetland with sea level rise. However, using LiDAR for these purposes requires solid information on the elevation range at which tidal wetlands currently occur -- on both tidal and geodetic datums. Accurate mapping also requires knowledge of the nontidal components of inundation regimes, as well as other factors such as estuary geomorphology and beaver activity. Brophy will discuss the methods she is using to characterize these factors and create maps of current, historic and possible future tidal wetlands on the Oregon Coast.

About the Presenters:
John Bauer is the GIS Analyst at The Wetlands Conservancy. He was a key contributor to the development of the Oregon Wetlands Explorer, responsible for the development of the Oregon Wetlands Geodatabase. Prior to his career in ecology, John worked in the computer industry designing microprocessors.

Laura Brophy provides state and regional leadership in coastal wetland restoration and conservation for Oregon and the Pacific Northwest. She is a certified Professional Wetland Scientist with over 25 years of field experience in habitats ranging from Pacific Northwest coastal forests and estuaries to tropical rainforests and high desert. As owner and principal of Green Point Consulting and Director of the Estuary Technical Group at the Institute for Applied Ecology, she generates and distributes scientific data and guidance to assist restoration practitioners and policymakers. Laura's project focus is dual-scale, including basin scale strategic planning and site-scale restoration design, monitoring and implementation. At Oregon State University's College of Oceanic and Atmospheric Sciences, she conducts and directs research to advance restoration science and bridge the research-application divide. Laura received her B.S. from Carleton College and her M.S. from the University of Minnesota.

*Thank you to all of our sponsors, presenters, and attendees!*