

**UNAVCO Short Course: “Processing and Analysis of GeoEarthscope and Other
Community LiDAR Topography Datasets”**

**April 30 - May 1, 2008
Arizona State University: Tempe, AZ**

Agenda

Wednesday, April 30th:

- 8:00 am Welcome and introductions
Goals of course and agenda review (Crosby)
Acknowledgements (Crosby)
Overview of GeoEarthscope (Arrowsmith)
- 8:20 am General overview of applications of LiDAR (Arrowsmith)
- 9:15 am Review of LiDAR technology and data acquisition. Overall LiDAR processing workflow - what happens at each step, who typically does it, what is the acquisition and processing parameter space that geoscience users should be aware of.
- Sensor types and pulse rates (Crosby/Arrowsmith)
 - GPS control and dataset accuracy vs. quality (including “corduroy” issues) (Crosby/Arrowsmith)

10:00-10:30 am Break

- The role of vegetation in determining "quality" of the data (Crosby)
- B4, NoCal and SoCal experience (Crosby/Arrowsmith)

11:00 am EXERCISE: An introduction to point cloud data using LVIZ for visualization (Arrowsmith/Crosby)

11:30 am - 12:30 pm Lunch

12:30 am Data volumes, considerations for managing these datasets, projection issues, metadata (Crosby)

1:00 pm Accessing LiDAR data: GEON LiDAR Workflow & other sources of publicly available data (Crosby).

1:30 pm EXERCISE: Accessing data via the GEON Portal (pre-computed DEMs, point cloud data, custom DEMs). (Crosby)

2:00 pm EXERCISE: The basics – Getting terrain models into GIS software and constructing useful visualizations and derivatives.

- Global Mapper (including KMZ export, WMS overlays) (Crosby)

- ArcGIS (Arrowsmith, Crosby)

3:00 pm *Break*

3:15 pm DEM Generation from point cloud data – algorithm (Krig/Bin/TIN) and considerations (Arrowsmith)

3:45 pm EXERCISE: Building custom DEMs using GEON Points2Grid + visualization and comparison between NSAF and NoCAL data (Arrowsmith)

EXERCISE continued (time permitting): Using the GEON LiDAR Workflow to access data and produce custom DEMs (Arrowsmith, Crosby)

4:30 pm Final discussion

5 pm *End for the day*

6pm *Group dinner at Gordon Biersch in downtown Tempe – see map for directions.*

Thursday, May 1st:

8:00 am EXERCISE: Using free and/or open source tools to build workflows to manipulate and process LiDAR data (Crosby)

- LasTools (point cloud format conversions)
- ALDPAT (point cloud filtering)
- GEON Points2Grid (DEM generation)
- GDAL w/ discussion of EPSG (Raster data conversion and projection)

9:30 am Quantitative geomorphic analysis using LiDAR (DiBiase)

- Scale issues: High-resolution LiDAR DEMs versus >10 m DEMs.
- Why is the jump in scale important?
- Technical aspects of computing flow accumulation and slope

~ 10:30 am *Break*

EXERCISE: Computing flow accumulation on LiDAR and 10 m DEMs – compare and contrast (DiBiase)

- Airborne vs. Terrestrial Laser Scanning applications in geomorphology.
- Hillslope curvature and soil thickness.
- Hillslope form (from LiDAR) and process

~11:45 am Final Discussion

12 pm *End & Lunch*