26th Annual New York State
Geographic Information Systems Conference
Saratoga Springs, NY

Sunday, October 24, 2010
Time: 12:00- 4:00pm

Pre-Conference LiDAR Seminar: Now that I have it, what can I do with it?

**Instructors:**
Benjamin H. Houston, P.E., PMP, GISP
Karen Kwasnowski, GISP

**Aim:** To provide both GIS practitioners and managers a detailed understanding of the challenges and the potential for integrating LiDAR data into GIS projects. This seminar will focus on three specific types of GIS analysis: drainage analysis, impervious surface analysis, and tree canopy analysis.

**Learning objectives:** By the end of the workshop, you will:
- know the steps necessary to process a LiDAR point cloud for drainage analysis
- know the key derivative datasets necessary to support successful drainage analysis
- anticipate the key challenges in using LiDAR for drainage analysis at varying scales
- articulate the role of LiDAR in impervious surface and tree canopy analysis
- articulate the return on investment for using LiDAR in impervious surface and tree canopy analysis
- understand what software tools are needed to process and analyze LiDAR data

**Who the course is intended for:**
If you are interested in LiDAR data, you should register for this seminar. The content is designed for an audience of all skill levels, and no previous experience using LiDAR data is necessary. Highly technical and skilled analysts will be able to better assess their needs in order to accomplish the types of analysis presented, and managers or casual/novice GIS users will better understand how advanced analysis using LiDAR can support their project goals.

**Software and Equipment:**
This seminar will give case study examples using a number of different software packages, both commercial and open source. This is NOT designed to teach specific skills in any one software package but to help you make sound decisions about tool and training investments. Handouts, along with a DVD of sample software and data will be provided.

**Teaching time:**
Approximately 4 hours consisting of lecture, discussion and computer based demonstration.
Course outline: The course will cover:

Review of LiDAR
   Brief review of airborne LiDAR systems
   Collection and Sensor parameter
   Standard processing and deliverables
   Data Quality - issues that affect the point cloud and the bare earth surface
Processing LiDAR points into a drainage surface
   Hydro-enforcement vs. hydro-conditioning
   FEMA Standards review
   USGS Standards review
   Point classification
   Breaklines and breakline development techniques
   Drainage enforcement techniques - the “New England” method
Quiz
Drainage analysis
   Survey of commands and functions using ESRI Spatial Analyst and TauDEM
   Catchment level mapping and NHDPlus
   Impact of roads and culverts
   Applications Discussion and Examples
      Stormwater program management requirements
         (i.e., sewershed Mapping, IDDE, BMP siting and design, etc.)
      Screening level water quality modeling and analysis
         (i.e., RBDE, VSA, ECM, etc.)
      Environmental emergency response
         (i.e., spills, floods, etc.)
Quiz
Impervious Surface Analysis
   Review of pixel based classification
   Impact of scale and resolution on data integration
   Object Based Image Analysis (OBIA) with LiDAR and Color InfraRed (CIR) imagery
   Impervious surface mapping example
Quiz
Tree Canopy Analysis
   Comparison of three different approaches:
      LiDAR only
      Pixel based integration of LiDAR and CIR
      OBIA based analysis
   Tree Canopy Mapping example(s)
Quiz