

## **Hands On 2D and 3D Environmental Data Visualization**

*March 14, 2019*

*DoubleTree Hotel, Andover, MA*

### **Course Description**

This four hour, hands on course is designed to provide an introduction to the Surfer<sup>®</sup> and Voxler<sup>®</sup> computer programs used to create impactful 2D and 3D data visualizations for the geosciences industry. This course will appeal to LSPs seeking a cost effective way to create technically accurate and visually impactful visualizations of environmental data distributions.

The course will provide attendees with knowledge of the mathematics behind both programs. In particular, a focus on weighted average calculation methods will be presented, and the importance of anisotropy will be discussed.

For each software package an introduction will be presented outlining the program capabilities. The software interfaces will be described, and students will then begin creating visualizations from data sets provided by the instructor.

Attendees will be required to bring a PC compatible laptop computer to the course, and will need to download and install demo versions of each software package.

Example images created by the instructor are attached. Users will gain a working knowledge of how to create similar visualizations for their project sites.

## Syllabus: Hands On 2D and 3D Environmental Data Visualization

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### Introduction

- 1:00 Introduction of Speaker and Topic. Goal of the course.
- 1:05 Review of common graphic software and graphic types. AutoCAD, TurboCAD, Rockworks, EVS/MVS, ESRI, vector graphic vs. raster graphics.

### 2D Data Visualization Using Surfer

- 1:10 Introduction to Surfer, program capabilities, software history, screen layout
- 1:20 Loading a basemap (from a geotiff or MrSid file)
- 1:30 Setting map limits, adjusting scale, setting opacity
- 1:40 Creating a post-map from X,Y locations (selecting symbol type, size and label)
- 1:50 Data gridding (search parameters, convex hull blanking)
- 2:00 Creating a contour map and vector map (setting levels, color scales, contour labels)
- 2:20 Adding non-map elements (logo, notes, linework)
- 2:30 LiDAR Point Cloud" files (.LAS, .LAZ, .img)
- 2:40 Import last (ground) returns and full point clouds
- 2:50 Introduction to 3D viewer
- 2:55 Map export, save and print options

### 3:00 Break

### 3D Data Visualization Using Voxler

- 3:15 Introduction to Voxler, program capabilities, screen layout
- 3:25 X,Y,Z,C and "From/To" data input
- 3:30 3D gridding with emphasis on anisotropic searching and weighting
- 3:40 Importing Surfer .GRD files and creating ground surface and groundwater  
**Height Fields.** Add image and vector overlays to heighfields.
- 3:50 Graphical modes (isosurfaces, volume render, face render, oblique image ortho image)
- 3:55 Axes, color scales, bounding boxes
- 4:00 Clip planes
- 4:10 Scatterplots and the **WellRender** module
- 4:30 **IsoSurfaces, HeightFields,** Image and Vector overlays
- 4:50 Summary, Legal Issues, Q & A, Open Discussion

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### **Instructor Biography:**

#### **Stephen S. Boynton, LSP, Subsurface Environmental Solutions**

Mr. Boynton is a Massachusetts Licensed Site Professional with 35+ years of professional experience in environmental and geotechnical engineering consulting. Mr. Boynton began using Surfer in the late 1980s to create graphical output from groundwater and contaminant transport modeling software. He has used the program continuously since then to create groundwater contour and flow direction maps, contaminant distribution maps, and subsurface cross-section maps.

In 2011 Mr. Boynton served as a software beta-tester for Golden Software Inc.'s Voxler 3D imaging software (releases). In 2015 Mr. Boynton was again a beta-tester for Voxler 4. In the fall of 2018 Mr. Boynton joined

Golden Software's Surfer Beta Testing group. Mr. Boynton has joined Golden Software to present two webinars on use of Voxler for creating 3D LNAPL distribution models. These webinars are available on the Golden Software website for viewing.

Mr. Boynton is a recognized expert in the management of Light Non-Aqueous Phase Liquid (LNAPL) sites. He has spearheaded efforts in Massachusetts to revise LNAPL regulations and practice standards. These changes were implemented by the Massachusetts Department of Environmental Protection in 2015 and 2016. In 2006 Mr. Boynton founded Subsurface Environmental Solutions, LLC (SES). SES specializes in providing rapid LNAPL site characterization, and developing cost-effective LNAPL site management approaches.