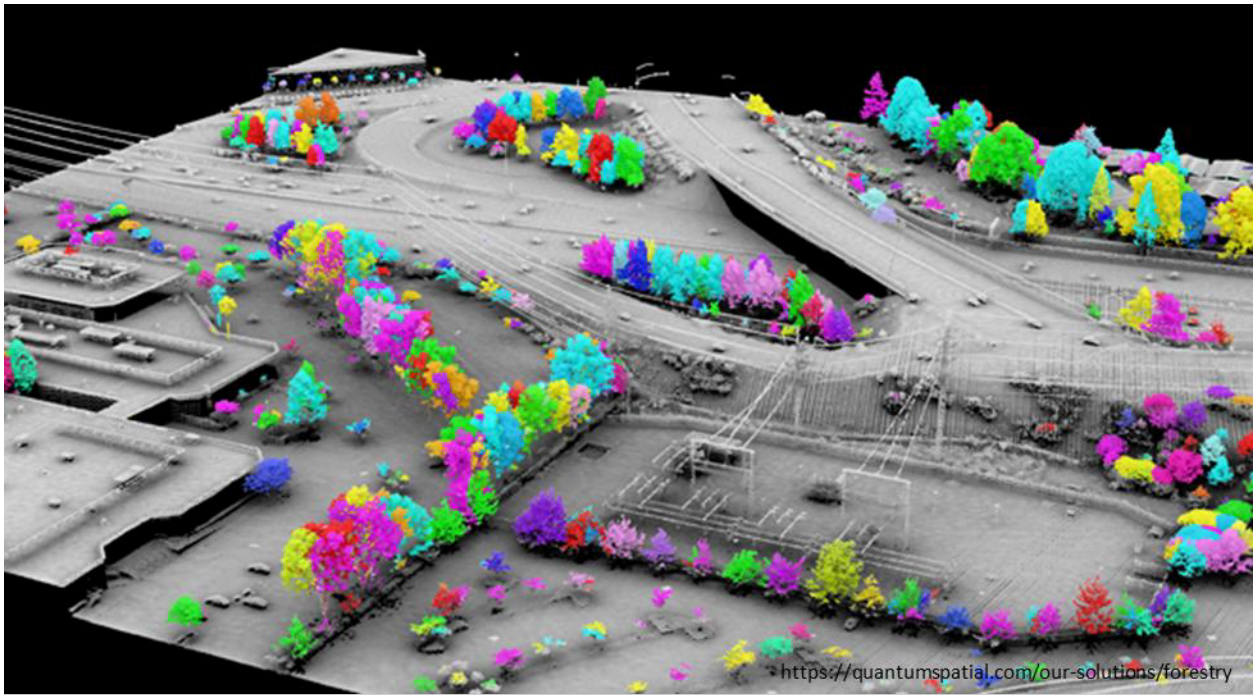
3D Mapping with LiDAR



Instructor: Junhak Lee (junhakl@uoregon.edu), Dept. of Landscape Architecture, Univ. of Oregon
LA 459/559: Fall 2017 - online course (2 units tech course). Office Hours: TBA

This course satisfies Landscape Architecture Tech Workshop requirements.

LiDAR (Light Detection and Ranging) is a cutting-edge remote sensing technology that uses laser pulses to determine a distance between the sensor and a surface or object. Recently, LiDAR has become an inevitable source to generate 3D elevation and terrain models with very high accuracy for both natural and built environments. The course will introduce students the basic principles of LiDAR, LiDAR sensors, platforms, data collections, data processing, and analysis. Students will learn basic knowledge and practical skills to use LiDAR data sources and extract intended information in various applications, including topographic mapping, vegetation analysis, and 3D modeling of urban infrastructure.

Course Objectives

The students will be able to:

- Describe the basic operational characteristics of lidar instruments and platforms
- Visualize LiDAR data in 2D and 3D
- Extract spatially explicit 3D information from LiDAR datasets
- Understand limitations and sources of errors of LiDAR
- Extend the learned skills and knowledge to solve real-world problems

Textbook

- Making Spatial Decisions Using GIS and Lidar: A Workbook by Kathryn Keranen and Robert Kolvoor (2015)

Software

- ESRI ArcGIS
- R (R is a language and environment for statistical computing and graphics)

Course Mechanics

Although this course is online (on Canvas) and proceeded asynchronously (i.e. students can access class materials and conduct lab exercises anytime with their own time schedule), class activities and assignments (video lectures, readings, quizzes, and lab exercises) will be released on a weekly basis (with weekly due dates). Hence, course workloads are evenly distributed throughout the term. The weekly hands-on exercises are mainly based on the textbook and cover various applications, including topography analysis, visibility analysis, sea-level rise, solar potential estimation, shoreline analysis, and vegetation analysis.

In addition to online assistance, the instructor will be available during office hours to work one-on-one with students wishing in-person assistance.