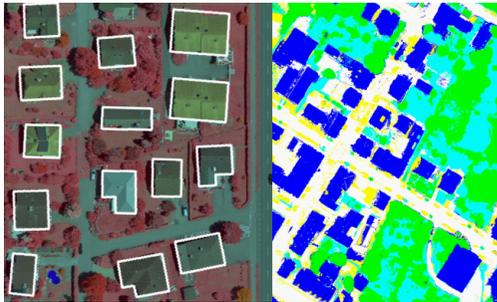




# EuroSDR Educational Service 2019

The 16<sup>th</sup> series of short e-learning courses from EuroSDR will begin with a **pre-course seminar** hosted by Dr. Julià Talaya at the Cartographic and Geologic Institute of Catalunya, Barcelona, Spain, from 4<sup>th</sup> to 5<sup>th</sup> March 2019. The goal of the seminar is to (i) introduce the topics and content of four e-learning courses; (ii) present the Moodle learning platform; (iii) bring together the participants and the tutors which makes their future on-line communication easier. The seminar is followed with **four e-learning courses**. Each course requires about **thirty hours of online study** and it is completed over a period of **two weeks** during spring 2019.



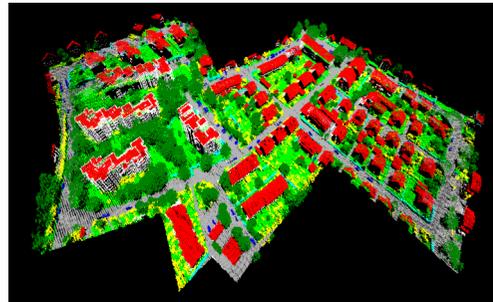
## Automatic Topographic Mapping through Description and Classification of Remotely Sensed Imagery and Cartographic Enhancement

*Tutors: Joachim Höhle (Aalborg University), Sébastien Lefèvre & Bharath Bhushan Damodaran (Université Bretagne Sud)*

The course introduces advanced classification schemes with the goal to produce and update 2D topographic databases. The inclusion of the spatial descriptors such as geometry and shape are important to characterize the topographic objects in the orthoimages. This course will present some of the challenges in mapping from high resolution orthoimages. The solution to these challenges will be provided by the efficient and effective tool called as morphological attribute profiles. They are multi-scale attributes and are constructed by hierarchical representation of the images, thus enabling object-based image analysis. These characterizations are classified using well-established machine learning methods and different data sources (either raw or derived features). Different approaches to assess the thematic and geometric accuracy of maps will be discussed, and lastly the cartographic enhancement of the classification maps at different levels of quality will be presented. Solutions to the tasks are given by means of detailed course material including open source programs.

Dates: 11<sup>th</sup>–22<sup>th</sup> March 2019

**Fees** 600 € for pre-course seminar + 1 or 2 courses  
700 € for pre-course seminar + 3 or 4 courses  
100 € for pre-course seminar only

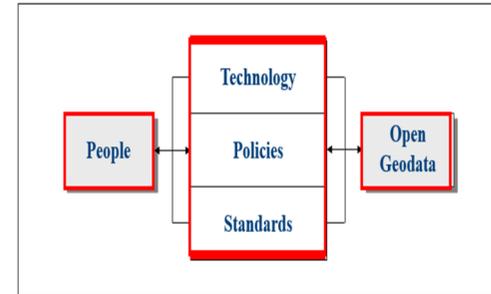


## 3D Sensing, Scene Reconstruction and Semantic Interpretation

*Tutors: Martin Weinmann & Boris Jutzi (Karlsruhe Institute of Technology), Michael Weinmann (University of Bonn), Franz Rottensteiner (Leibniz Universität Hannover)*

The adequate acquisition and analysis of a scene are of great interest for photogrammetry, remote sensing, computer vision and robotics. In the scope of this course, we will address four major issues in this regard. The first part will give a general introduction on geometry acquisition via (passive and active) optical 3D sensing techniques. The second part will focus on active optical 3D sensing as commonly used for the acquisition of large geospatial data and provide a survey on the extraction of descriptive features from such data. The third part will focus on a semantic interpretation of point cloud data and thereby address all components of a typical processing workflow from given point cloud data to a semantic labeling with respect to user-defined classes. The fourth part is dedicated to deep learning techniques for the semantic labeling of point clouds as well as to the context-based classification of these data using graphical models such as Conditional Random Fields (CRFs).

Dates: 1<sup>st</sup>–12<sup>th</sup> April 2019



## Open Spatial Data Infrastructures

*Tutors: Joep Crompvoets (KU Leuven), Bastiaan van Loenen (TU Delft)*

This is an introductory course to Open Spatial Data Infrastructures (Open SDI). SDIs facilitate more and more the accessibility to open (spatial) data and provision of open services. Open SDI refers to standards, technologies, policies, and institutions necessary for opening the open data and services. This course gives a comprehensive overview on the state-of-the-art in Open SDI and its key components, introduces the participants to the underlying principles of Open SDI and lets them experience hands-on what it means to establish and maintain an Open SDI. A number of topics will be discussed: key standards, architectures, (network) services, relevant EU-regulations and policies, governance strategies, and key institutions. At the end of the course, participants are: informed about Open SDI strategies around the world, aware of the main strengths, weaknesses, opportunities and threats of Open SDI, familiar with the latest technological developments, capable to facilitate the opening of open data using latest developed tools, and able to evaluate Open SDIs.

Dates: 6<sup>th</sup> May – 17<sup>th</sup> May 2019



## Deep Learning for Remote Sensing

*Tutors: Loïc Landrieu (IGN France), Sébastien Lefèvre (Université Bretagne Sud), Bertrand Le Saux (ONERA)*

Deep Learning has led to significant breakthroughs in various fields including computer vision. Remote sensing also benefits from such methodological advances and deep networks currently achieve state-of-the-art results in many automatic tasks, such as object detection, semantic segmentation (e.g. for land cover mapping), change detection, etc. The goal of this course is to introduce deep learning, review the main architectures relevant for cartography, photogrammetry and other EuroSDR-related fields, as well as to train the participants with available software and codes.

It is complementary to the course "Topographic Maps through Description and Classification of Remotely Sensed Imagery and Cartographic Enhancement" that focuses on the traditional approach to automated classification (i.e. feature extraction and supervised classification) while deep learning brings a paradigm change by learning both the features and the classifier, at the possible cost of higher labelled datasets and higher computational resources. The audience will be welcome to come with their own data to discuss the lecturers about the relevance of deep learning solutions in their context.

Dates: 3<sup>rd</sup>–14<sup>th</sup> June 2019

For more information visit  
<http://www.eurosd.net/education/current>

