

# First Practical Workshop on Advanced Computational Archaeology

Hèctor A. Orengo i Josep Maria Palet, membres del **Grup de Recerca en Arqueologia del Paisatge** (ICAC) organitzen, del 30 d'octubre al 9 de novembre, unes sessions de treball al voltant de la computació arqueològica avançada. És una de les activitats de difusió previstes en el projecte **InterArPa**, finançat pel **programa I+D** del MINECO (HAR2015-64636-P).

La primera edició del Workshop on Advanced Computational Archaeology s'adreça a arqueòlegs i arqueòlogues amb experiència en l'ús de teledetecció, SIG i altres **eines geoespacionals**. Un entrenament pràctic intensiu que combina breus **presentacions** sobre temes específics amb llargues **sessions pràctiques** que permetran aprofundir en les tècniques de computació i comprendre la seva aplicació en diferents àrees i situacions d'estudi.

**First practical workshop on advanced computational archaeology**

Application of machine learning and deep learning algorithms for the detection of archaeological sites and features using satellite Big Data within cloud, parallel and virtual computing frameworks.

This first workshop in advanced computational archaeology area is for archaeologists with experience in the use of remote sensing, GIS and other geospatial tools. Places are limited to 5 students. A week of intensive practical training will combine short presentations on the topic with long hands-on sessions designed to provide the students with a clear understanding of the techniques and how to apply them in different study areas and situations.

**Programme**

Working with massive and large-scale datasets: virtual machines, Docker images, parallelisation and cloud computing.

Lecture-based seminar with practical examples on how and when to use different computing methods according to the analysis of need and access to resources.

Large scale, Multi-temporal satellite imagery analysis (multi-spectral and SAR) for paleoenvironmental reconstruction using cloud computing.

Software: Google Earth Engine, GRASS GIS Languages: JavaScript

Practical introducing multi-temporal satellite data analysis.

Practical with GIS in which the students will learn to create simple algorithms to create multi-temporal multi-band images and composites under different environmental conditions to enhance the visibility of archaeological features.

Several seminars on the use of advanced algorithms for the detection of archaeological features.

Practical sessions with GEE and GRASS applying advanced algorithms for the detection of archaeological features. Algorithms include raster operations, filters, spectral decomposition techniques, and micro-relief analysis procedures.

Machine learning and deep learning applied to the detection of archaeological sites and features.

Software: Google Earth Engine platform, QGIS, TensorFlow, Jupyter, Colab Languages: Python, JavaScript

Practical sessions in which several Machine Learning methods (including Random Forest, SVM and CART) and Deep Learning methods such as Neural Networks for the detection and classification of archaeological features will be tested using a combination of software and computing methods.

30<sup>th</sup> of October to 9<sup>th</sup> of November 2018,  
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Concretament, en les sessions pràctiques es provaran diverses tècniques de **Machine Learning** (Random Forest, SVM, CART...) i de **Deep Learning**, com ara les com Xarxes Neuronals per a la detecció i classificació de característiques arqueològiques.

