

Geocomputation and Machine Learning for Environmental Applications, 7.5 hp

Schedule:

We will meet Tuesday and Thursday 14:00 – 16:30, from April 6th to June 3rd 2021, following the below schedule. Please feel free to enter in the virtual class 10 minute before the scheduled starting time for troubleshooting a simple casual chat with us and your colleagues. We plan to have a 10-15 minutes break during each class.

- OSGeoLive Installation. Working under Linux environment and with the sw in the OSGeoLive.
- Linux bash language for file management and text manipulation.
- Introduction to Version Control via git: clone, add, commit, push
- GDAL/OGR for raster/vector operations: cropping, reprojection, map algebra, resampling, buffer, vrt.
- PKTOOLS for raster/vector operations: masking, composite, filtering, histogram, zonal statistic, etc.
- Introduction to GRASS: grassdb, location, mapset, region, raster and vector operations.
- Introduction to python: data types, tuples/lists/dictionaries, for loops, conditional statements.
- Panda for table analysis and plotting in python: dataframe properties, descriptive statistics
- Geopanda for vector analysis: reading vectors, clipping, intersect, extract, geocoding.
- Rasterio for raster analysis: reading raster, map algebra, cropping, masking, zonal statistics.
- Introduction of probability: distribution, transformation, linear/multiple regression, dealing with dresiduals.
- Geostatistic 1: spatial interpolation, spatial autocorrelation, kriging, spatial autoregressive model
- Geostatistic 2: bayesian estimations, markov processing
- Machine learning 1: machine learning theory, unsupervised learning algorithms, such as clustering and pattern recognition.
- Machine learning 2: supervised learning algorithms such as ensemble learnings, neural networks and graph theories.