Agent-based Modelling of socio-environmental dynamics in Archaeology

Keywords: Agent-based Modelling, Archaeology, Human-environment interactions, Settlement Dynamics, Roman period

Working context:

The internship is part of the interdisciplinary project *ModelAnSet - Modeling the role of socio-environmental interactions on Ancient Settlement Dynamics*, involving archaeologists, palaeoenvironmentalists, computer scientists, economists and geographers at University Côte d'Azur, Nice (France). It is supported by the « Complex Systems » Academy of Excellence of UCA.

The project aims at better understanding the respective impact of environmental (mainly climatic) and social (economic context and human behaviour) factors on the transformations of the settlement system during the Roman period (in terms of number, location and type of the rural settlements: Bertoncello *et al.* 2012). To this end, an Agent Based Model (ABM) has been implemented to simulate the creation, transformation or disappearance of rural settlements, according to the behaviour of their owners, which is influenced both by the environmental and macro-economic conditions (Bertoncello *et al.* 2018).

The internship can be part of a Master thesis (Master 1 or Master 2), provided that there is an agreement between the student's home university and University Côte d'Azur (ERASMUS+ scheme) to validate the ECTS thus acquired.

Internship objectives:

A first prototype of the ABM has been implemented on the NetLogo platform, but it needs further developments:

- Adjusting the implemented ABM (initialization, model's operation, execution reports and output data to analyse the results, etc.);
- Developing the model (refine and complete the model's parameters, coupling the ABM with other sub-models (palaeo-climatic, agricultural production);

The selected candidate will:

- Code and implement the ABM in NetLogo according to the specifications given by the pluridisciplinary team of research;
- Carry out an experimental campaign using the implemented ABM, collect and analyse the results of the various simulated scenarios, in collaboration with the pluridisciplinary team of research.

Required profile:

- The candidate will be a graduate student pursuing a Master (M1 or M2) in Archaeology, Geography, Geomatics or Computer science
- Knowledge of the NetLogo platform and language
- Experience on modelling
- Interest for socio-environmental issues
- Autonomous and motivated person, dynamic and source of proposals
- Keen on participating in an interdisciplinary collaboration

Terms of the internship:

- The internship can be part of a Master thesis (M1 or M2)
- Remuneration: 550 € per month
- Duration: 3 to 6 months
- Dates: starting 1st March or 1st April 2020
- Location: CEPAM Laboratory, University Côte d'Azur, Nice (http://www.cepam.cnrs.fr/)

Mentoring:

Supervisor: Frédérique Bertoncello (CNRS Researcher, Archaeology, CEPAM, Nice)
Mentoring: Marie-Jeanne Ouriachi (Assistant Professor, Ancient History, CEPAM), Andrea Tettamanzi (Professor, Computer Science, I3S, Sophia Antipolis), Célia Da Costa Pereira (Assistant Professor, Computer Science, I3S, Sophia Antipolis)

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Bibliography

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