



## Profile for Doctoral Position

### Research Framework

**Work-Package:** *Changements environnementaux et sociétés dans le passé* (Environmental change and societies in the past)

**Heads:** Catherine Kuzucuoglu and Zoï Tsirtsoni

### Description of the Position

**Profile title:** Reconstitution of Paleo environments and man-environment interactions in the Maya tropical lowlands during the recent Holocene.

**Research proposal:**

The understanding of past environmental and societal dynamics requires the consideration of hybrid research objects (eco-socio systems and anthropo-systems, Burnouf *et al.* 2003, Levêque *et al.* 2003) and their interdisciplinary study based on a systemic approach. Such an approach is particularly useful in the case of the Maya tropical lowlands where an excessive abundance of water in the rainy season and its extreme scarcity during the dry season alternate in a Karst setting. Nonetheless, these conditions did not prevent one of the most complex societies of the Americas from flourishing in this location.

The aim of this doctoral study, which has been developed within a pluridisciplinary team (anthracology, malacology, geomorphology, geoarchaeology, archaeology, archaeozoology), is to reconstitute the rural and ecological dynamics (landscape dynamics) and the dynamics of vegetation resource management, thereby encompassing both climatic and environmental factors as well as social, cultural, political and economic ones. The biophysical milieus and vegetation resources were structural elements for the Mayan societies of the central lowlands (Atran 2003, Wahl *et al.* 2007).

A number of questions arise here: How did the plant cover and formations vary spatially and temporally under the influence of anthropogenic (agriculture, silviculture etc.) and geodynamic (climate, erosion etc.) factors? How did the societies exploit the vegetation resources provided by their environment? What impact did the spatiotemporal variations in these resources have on the environmental and, possibly also, socio-environmental crises experienced over the course of the last three millennia? Conversely, what was the impact of the social, political and economic crises experienced by the Mayan cities on their immediate environment? Finally, what resilience did the biophysical environments and societies display in the face of these crises ?



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The innovative methodological developments associated with this doctoral study will involve crossover studies in an intertropical context of two bio-indicators, i.e. pollen and phytoliths, which are not very commonly deployed in this field of study – not even in Europe. Their integrated study (multi-proxi) aims to exploit the synergies that exist with regard to the potential for the reconstitution of Paleo environments so that it will be possible to go beyond the limits inherent in each of the proxies (bias associated with preservation, level of taxonomic determination, component of the vegetation landscape and spatial scales of the reconstitutions etc.).

The area to be studied would encompass the territory (hinterland) of the classical Mayan city of Naachtun (150 AD – 950 AD), which was located in the Maya Biosphere Reserve in the far north of Guatemala. It would also include two of the main river basins, in which the city territory is situated (the eastern (Rio Azul) and western basins). The sedimentary records to be studied will be obtained in different contexts (on- and off-site).

The research to be carried out by the doctoral student will benefit from a preliminary chronostratigraphic frame, which will be refined in detail in the context of the proposed thesis, and from initial sedimentary series collected in contexts that will similarly benefit from greater diversification and from further and more targeted study.

This doctoral research project will require the development of methods, a sampling strategy in particular, for the implementation of ecological and landscape reconstitutions at different levels with a view to elucidating the evolution of these processes at both the local (landscape units in wetlands and valleys and dwelling units in the city) and regional (territorial and river basin units) levels of the vegetation cover.

The environmental and socio-environmental dynamics will be studied on the basis of a diachronic approach. The adopted temporal framework is that of the last three millennia (1000 BC to the present, i.e. the recent Holocene). The research will mostly focus on the millennium prior to the abandonment of the region around 1000 AD.

Where possible on the basis of the sedimentary records, the aim of the methodological developments will be to characterize both short-term phenomena (for example: the consequences of pluri-decadal and pluri-annual episodes of drought for the vegetation cover) and longer-term phenomena (for example: the consequences of the Mayan populations' sustained influence and abandonment on the vegetation cover).

The field work (to be carried out in March and April 2016, 2017 and 2018) in the context of the second phase of the Naachtun Project (2015-2018), which is being carried out by UMR 8096, will alternate with laboratory work in France (the LGP's Pollen and Phytoliths Platform) and abroad (Berkeley, USA).

This doctoral research will benefit from existing reference collections in palynology available abroad, which, however, need to be supplemented and established for France where they are not currently available. It will also contribute to the development of a reference collection for the study of phytoliths. The development of up-to-date references will enable, in particular, the characterization of agricultural and forestry practices (terraces, open fields, the edges of the *bajo*, forests etc.), and of the ecology of natural and artificial wetlands (ecological gradients from the aquatic environments of the *civales* (perennial water bodies located in the *bajos*) and *rios* (seasonal watercourses) to the well-drained environments of the bajo and valley basins). It is imperative that the successful completion of this doctoral research also include further training in the study of bio-indicators.





The basic research studies developed in the context of this doctorate will contribute to establishing a better knowledge of the history of today's Petén forest. They may also have a more operational impact by helping to improve the knowledge and management of current biodiversity within the Maya Biosphere Reserve (in particular the Naachtun-Dos Lagunas biotope, CONAP) (Rodriguez and Rorive 2003).

## Planned Collaboration

The collaboration planned in the context of this doctoral contract will involve several laboratories and institutions in France and abroad (see names and actors listed below). The successful completion of the doctoral research will also be based on the scientific, logistical and financial frameworks of several research programmes indicated below.

### **Laboratoire de Géographie physique ('Laboratory of Physical Geography') - UMR 8591 LGP**

- Cyril Castanet, lecturer (MCF) Université Paris 8 Vincennes Saint-, UMR LGP: specialized in the reconstitution of environments and socio-environmental interactions using geomorphological and geoarchaeological approaches;
- Aline Garnier, lecturer (MCF) Université Paris-Est Créteil Val de Marne, UMR LGP: specialized in the reconstitution of environments and socio-environmental interactions based on the study of phytoliths in inter-tropical contexts;
- Agnès Gauthier, engineer UMR LGP: palynologist specialized in the reconstitution of Paleo environments of the Pleistocene and Holocene (Devès, Anatoly, Paris Basin);
- Nicole Limondin, Director of Research at the CNRS, UMR LGP: specialized in the reconstitution of quaternary continental Paleo environments through the study of terrestrial and fluvial malacological successions.

### **Laboratoire Archéologie des Amériques ('Archaeological Laboratory of the Americas' – UMR 8096 ArchAm)**

- Eva Lemonnier, lecturer (MCF) Université Paris 1 and UMR ArchAm: archaeologist specialized in the study of the agrosystems of the Maya lowlands;
- Philippe Nondédéo, researcher at the UMR ArchAm: archaeologist, Head of the Naachtun Project 2010-2018), specialized in the study of the Maya dwelling.

### **Other UMR (Joint Research Units)**

- Yann Le Drezen, lecturer (MCF) Université Paris 1, UMR Prodig, associate member of the LGP and member of Dynamite: specialized in the reconstitution of socio-environmental contexts and interactions based on the study of the fire signal;
- Louise Purdue, researcher at the CNRS, UMR 7264 (CEPAM): geoarchaeologist specialized in the study of agrosystems and hydrosystems.

### **Other research centres**

Geography Department, College of Letters & Science University of California, Berkeley / U.S. Geological Survey (345 Middle field Road, Menlo Park)

- Dave Wahl, Assistant Adjunct Professor, Ph.D.: physical geographer and palynologist specialized in the reconstitution of socio-environmental contexts and interactions of the



Maya lowlands in Guatemala.

*Centre d'Etudes Mexicaines et Centraméricaines, Antenne Amérique Centrale (CEMCA – Guatemala)*

- Sébastien Hardy, geographer (IRD-UMR Prodig), specialized in risk, Director of the subsidiary
- Technical directorate: *Oficina Técnica de Biodiversidad et Departamento de Manejo Forestal*.
- Regional directorate for Petén: Ervin Salvador López Aguilar (Director), Antigua Hospital de San Benito, Petén.

*Escuela de Biología, Facultad de Ciencias Químicas y Farmacia et Facultad de Agronomía, Universidad de San Carlos de Guatemala*

Associated research programmes:

- The NAACHTUN project (2010-2014) – *Anatomie d'une capitale régionale maya à la période Classique* extended for the period 2015-2018, will provide logistical support to the doctoral student.
- The HYDROAGRO Programme - *Dynamiques croisées des sociétés et des milieux dans les basses terres mayas : coévolution, crises et résiliences à Naachtun (Guatemala)* (Coordinator E. Lemonier & C. Castanet). Response to call for projects by the Université Paris 1 Panthéon – Sorbonne as part of its science policy 2014-2015.
- The MAYALID Project - *L'intersite Uxul-Naachtun: milieux, populations, interactions*. Response to the Franco-German call for projects in the humanities and social sciences (*Agence Nationale de la Recherche, ANR and Deutsche Forschungsgemeinschaft, DFG*), submission and evaluation of the project in 2015 (Coordinators P. Nondédéo, N. Grube).

## Required Qualifications, Skills and Aptitudes

The candidate must:

- hold a research masters in one of the following fields: geography (bio-geography), archaeology (archaeo-botany), ecology (Paleo-ecology), geology (bio-indicators);
- have a good knowledge and experience of research in the reconstitution of continental Paleo environments and Holocene socio-environments using a bioindicator, preferably pollen or phytoliths;
- display a willingness to be involved in the scientific project and research team: good interpersonal skills will be required for the laboratory team work (collaboration with technicians, engineers and researchers) and for the development of external collaboration (partner laboratories and other institutions in France and abroad associated with this doctoral project);
- have a good working knowledge of the following IT tools: standard office, database and



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possibly geomatics software.

- have a good knowledge of English and/or Spanish.

Additional Information	
<b>Commencement of the contract</b>	01/09/2015 or 01/10/2015 (according to preference)
<b>Duration of the contract</b>	3 years
<b>Host laboratory</b>	<b>Name:</b> Laboratoire de Géographie Physique UMR 8591 LGP <b>Address :</b> 1 place Aristide Briand 92195 Meudon <b>Potential thesis supervisor(s) :</b> <ul style="list-style-type: none"><li>- Supervisor: Nicole Limondin, DR CNRS, UMR 8591 LGP</li><li>- Co-supervisor: Eva Lemonnier, MCF, Université Paris1, UMR 8096 ArchAM</li></ul>
<b>Net monthly salary</b>	Approximately EUR 1350 (possibility of additional teaching assignments) <sup>1</sup>
<b>Contact</b>	contact@labex-dynamite.com or +33 1 49 54 84 21 cyril.castanet@cnrs-bellevue.fr nicole.limondin@cnrs-bellevue.fr philippe_nondedeo@yahoo.com Eva.Lemonnier@univ-paris1.fr

## Recommendations for the candidate(s):

### Recruitment procedure and schedule:

- **The application must be submitted electronically by application form** (<http://www.form-labex-dynamite.com/doc/en/>). It must demonstrate that the candidate fulfils the requirements indicated in the position profile (specified tasks and skills).

The application will include:

- a description of the doctoral project (5 to 8 pages maximum) and an abstract (2000 characters including spaces) indicating the theoretical basis of the research, the tests to be carried out on empirical materials, the methodology to be used, a feasibility report and project schedule;
- curriculum vitae;
- transcript of higher education record for first year of masters studies (*Master 1*) and the first semester of research masters (*Master 2*);
- a letter of recommendation from the supervisor of the research master's thesis;

<sup>1</sup> Depending on host or home institution.





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- a letter confirming the forthcoming defence of the candidate's master's thesis (prior to **31 August 2015**).

It is recommended (but not mandatory) for the candidate to establish contact with the potential thesis supervisor in advance.

- **The deadline for the submission of applications is 26 April 2015 (inclusive).**
- **The application summary sheet which will be transmitted automatically by e-mail** on completion of the electronic application must be sent by post (date as per postmark) or presented in person to the office of the LabEx Dynamite (190-198 avenue de France, bureau 008 or 004 Aile A, 75013 Paris) before the applications deadline.

*For your information: When the deadline for applications has passed, the LabEx Dynamite will contact the potential supervisor and the director(s) of the potential host unit(s) and will add two letters of invitation to the application.*

- The candidate(s) appointed following the evaluation of the applications and interviews (which will take place during the week of 15 June 2015) will be informed of the results of the application process from 22 June 2015.

