

ED STIC - Proposition de Sujets de Thèse pour la campagne d'Allocation de thèses 2017

Axe Sophi@Stic :

Titre du sujet :

Mention de thèse :

HDR Directeur de thèse inscrit à l'ED STIC :

Co-encadrant de thèse éventuel :

Nom :

Prénom :

Email :

Téléphone :

Email de contact pour ce sujet :

Laboratoire d'accueil :

Description du sujet :

Pottery studies are known to be pivotal within the archaeological field thanks to their contributions to the understanding of cultural traditions, social interactions and peopling dynamics. The reconstruction of pottery manufacturing was traditionally based on macroscopic examination until the implementation of new 3D methods. The latter enable to solve challenging questions on ancient materials characterization at different scales, in terms of microstructure, i.e. fabric, porosity and inclusions organization. However, the modelling of the material's microstructure needs critical improvements and objectification thanks to mathematical and physical developments, i.e. imaging issues, analysis of available heterogeneous noisy data, segmentation, 3D-shape recognition algorithms of features induced by the technical gestures. Our project provides a high level of expertise in Archaeology and Geomaterials already experienced (CIMO ANR <http://www.cepam.cnrs.fr/cimo/?lang=en>) as well as in Mathematics and

Physics, supporting a new transdisciplinary approach of ancient materials. This PhD allows cutting edge developments both in archaeological, physical, and mathematical sciences for modelling and detecting low level signals.

The candidate will have access to μ CT and Synchrotron datasets. He or she will have to provide an excellent knowledge in Applied Mathematics and imaging techniques (classification, shape recognition, geometrical approaches), and in computational programming languages. A general interest and knowledge in Social Sciences is welcome.

At the UCA, research will be mentored by one applied mathematician (INRIA) and one archaeologist (CNRS). The transdisciplinary focus needs a third mentor linking expertise in Physics, Mathematics, Statistics and Ancient Materials characterization: Dr Serge Cohen, CNRS Researcher, USR3461 - IPANEMA, CNRS, MCC, Université Saint Quentin (<http://ipanema.cnrs.fr/spip/>).

Bertrand, L., L. Robinet, M. Thoury, K. Janssens, S. X. Cohen & S. Schöder, 2012. Cultural Heritage and Archaeology Materials Studied by Synchrotron Spectroscopy and Imaging. Applied Physics, A 106(2), 377-96. doi:10.1007/s00339-011-6686-4

Chan, T. F. & J. J. Shen, 2005. Image processing and analysis: variational, PDE, wavelet, and stochastic methods: SIAM.

Sanger, M., J. Thostenson, M. Hill & H. Cain, 2012. Fibrous Twists and Turns: Early Ceramic Technology Revealed through Computed Tomography. Applied Physics, A 111(3), 829-39. doi:10.1007/s00339-012-7287-6

Sonka, M., V. Hlavac & V. R. Boyle, 2015. Image processing, analysis, and machine vision: CENGAGE Learning.

Direction des recherches

Directrice : (<http://www-sop.inria.fr/members/Juliette.Lebland/>), Ecole doctorale STIC (<http://edstic.unice.fr/en>).

Codirecteur : Didier Binder (<http://www.cepam.cnrs.fr/spip.php?article40>) Ecole doctorale SHAL (<http://edshal.unice.fr/>).

English version: