

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...) :

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Ultrasound, Transducers & Systems, Piezoelectric Materials & Devices, Electrical and Electronic Engineering

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD **Topic # (see list) :**

Title :

Subject :

Ultrasonic waves have proven to be a very efficient way to obtain images and quantified data from complex media in applications such as medical diagnostics and industrial defect detection, just to name a few. Acoustic microscopy is a technique that uses high-frequency ultrasonic waves that allow both images and mechanical & structural properties of small objects to be obtained at microscopic scale. It is currently used in fields such as microelectronics components characterisation. As these devices consist in multilayered structures, it is therefore essential to control the quality of their interfaces. Especially, delaminations at the interface between the packaging and metallic sub-layers is one of the major problems encountered by this industry. The implementation of ultrasonic methods such as acoustic microscopy, should allow to better identify and characterize the problems of delamination in these components. Moreover, no research has been published on its use to study artefacts from archaeological sites. Ceramic artefacts are a current family of objects that can reveal valuable archaeological information (composition, porosity, rigidity and structural characteristics). This PhD project aims at using acoustic microscopy and other ultrasonic measurements, in order to obtain quantitative parameters concerning both delaminations problems in electronic components, and ceramic samples characterisation from different periods and geographical sites.

Keywords :

ultrasonic waves, non-destructive evaluation, microelectronic components, archaeological materials

Expected collaborations :

Co-supervision with Laboratoire Archéologie et Territoires (Tours). Collaborations with manufacturers of microelectric components such as STMicroelectronics, possible collaborations with other archaeological research groups including (but not limited to): Centre de Recherche sur la Physique Appliquée à l'Archéologie (Bordeaux), Institut de Recherche sur les Archéomatériaux (Orléans).

Background required from the applicant :

The candidate should be trained in applied physics or engineering and have strong experimental expertise as well as some modelling capabilities. A Masters level degree that includes courses in electronics/electrical engineering and/or materials science and/or signal processing and/or mechanical engineering is required, ideally in the field of acoustics / ultrasound. There is no need to have specific competencies in archaeology, but the candidate should be open-minded and curious towards human science, including history.

Existence of a PDF file detailing the proposal ("yes" or "no") :

(see guidelines on the website www-csc.utt.fr)