Post-doc application

The technology transfer from Europe to China in the 17th-18th centuries: non-invasive on-site XRF and Raman analyses of Chinese Qing Dynasty enamelled masterpieces made using European ingredients/recipes

The pioneering role of Chinese potters in the development of porcelain production is well known and the enthusiasm of European elites for these ceramics from the well-established importation of blue-and-white porcelain by Portuguese then Dutch and English sea trade in the 16th and 17th centuries has been largely studied. The role of the Jesuits living in Japan and China in the circulation of European science related to astronomy, mathematics, time measurement and painting is also rather well established. The role of Jesuits in the transfer of enamelling technologies is less documented and only studied for a few years by research on the Chinese and European archives (1-3). If shards are available, it is possible to use micro-destructive methods and many types of scientific analyses can be carried out in the laboratory using a variety of instruments (5). However, the analytical methodology for the intact invaluable objects is more restricted and difficult since it must be carried out in a perfectly non-invasive way, without any sampling and contact. The rarity and resulting great value of the objects studied (up to several million €) as well as their possible large size make their transfer to the laboratory facilities very expensive and impractical, inducing the necessity of on-site analysis in the exhibition halls or museum storerooms with the use of mobile analytical instruments. For several years, LADIR first and now MONARIS have been developing procedures and models allowing the implementation and interpretation of the results obtained by mobile Raman microscopy and X-ray fluorescence devices, specifically for the identification of colouring agents and silicate matrices of the glassy materials such as the enamels (5-11).

With the support of ANR EnamelFC project (*Global émail : Une histoire à parts égales des échanges culturels et technologiques entre la France et la Chine (milieu 17e-fin 18e siècle)*) associating French historians and French museums (12), and of bilateral cooperation with Palace Museum, Beijing (2), our objective is to seek in a perfectly non-invasive way, on-site, using mobile XRF and Raman spectroscopy set-ups in the material of the selected Chinese objects themselves the evidence of the use of European ingredients or recipes in the enamelling procedures, similarly to what was done for the first porcelains of Arita (Japan) in the late 16th century (5). Objects will be selected on the base of the work already conducted since 5 years (6-11). One of the objectives is developing chemometrics calculations using data recorded by various techniques and instruments in order to get a statistical view of the use of European ingredients (e.g. cobalt) and European recipes by Chinese craftsmen of Imperial Palace workshop, Imperial workshops (e.g. Jingdezhen) and private workshops (Canton, etc.) during Qin dynasty.

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Profile

Applicants must have a PhD degree (or other equivalent experience) in physics, and/or chemistry, and /or archaeological (conservation, heritage) science, and/or materials science. They should be highly motivated individuals with a keen interest in art conservation, history, or archaeology. Experience in XRF technique is welcome.

One-year contract.

Hosting laboratory

MONARIS « de la Molécule aux Nano-objets : Réactivité, Interactions et Spectroscopies », UMR 8233 Sorbonne Université/CNRS

Faculté des Sciences et Ingénierie, Sorbonne Université

Campus Pierre et Marie Curie, 4 Place Jussieu, 75005, Paris

Contact / information / application

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