



Conférencière invitée

Tsveta MITEVA | Laboratoire de Chimie Physique
Matière et Rayonnement

**ARTIFICIAL INTELLIGENCE FOR HYPERSPECTRAL
IMAGING OF HISTORICAL PAINTINGS**

**INTELLIGENCE ARTIFICIELLE POUR L'IMAGERIE
HYPERSPECTRALE DE PEINTURES HISTORIQUES**



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17 octobre 2023

à 11h00

UFR de Chimie

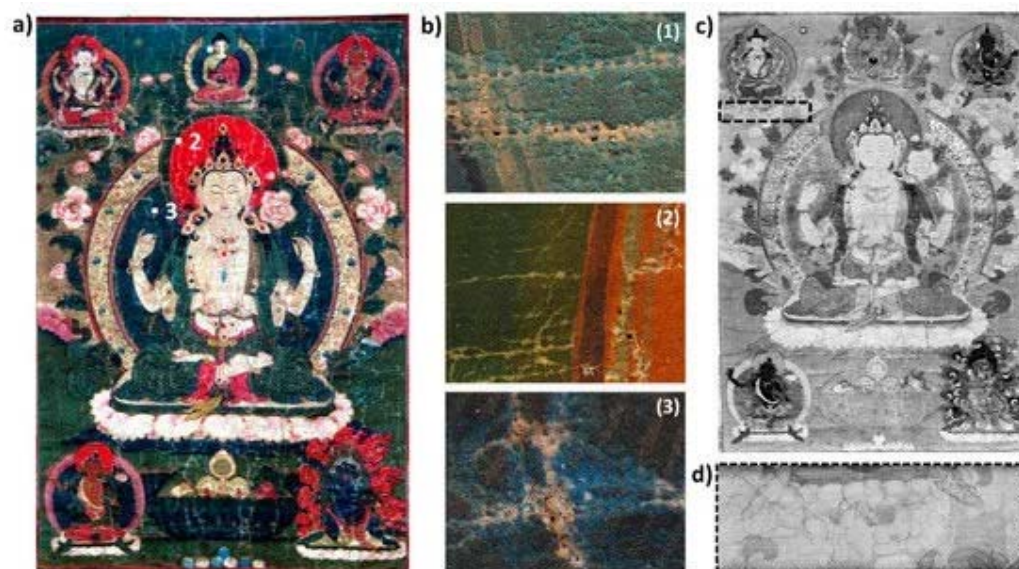
**Tour 32-42
Salle 101**

**Collation à partir
de 10h30**

Abstract - Hyperspectral imaging (HSI) in the visible and SWIR domains are fast and non-invasive imaging methods that have been adapted by the field of conservation science to study painted surfaces. By measuring the reflectance at a given pixel on a 2D surface, the resulting 3D hyperspectral data cube contains millions of recorded spectra. While processing such large amounts of spectral data poses an analytical and computational challenge, it also opens new opportunities to apply powerful methods of multivariate analysis for data evaluation. With the intent of expanding current data treatment of hyperspectral datasets, and solving the problem of nonlinear unmixing of hyperspectral reflectance data acquired on painted works of art, innovative data analysis approaches based on the use of AI have been recently developed. The efficiency and limitations of the proposed methods for painted surfaces from cultural heritage will be presented and discussed through the study of laboratory prepared paint mock-ups, and historical paintings.



[Plan campus](#)



(a) RGB image reconstructed from VIS-RIS dataset (red channel is assigned to 639.1 nm, green to 550.6 nm, and blue to 460.6 nm) of the historical tangka analyzed (size: 70 × 120 cm²). Three blue and green areas are located that refer to: (b) macro-photographs of three locations highlighting intrinsic mixture of blue and green particles, and surface degradation; (c) short-wave infrared imaging data at 1650 nm that reveals (d) the underlying preparatory drawing and contour of a floral shape, located using dashed rectangle in (c).

Pouyet, E., Miteva, T., Rohani, N., de Viguier, L.

[Artificial Intelligence for Pigment Classification Task in the Short-Wave Infrared Range.](#)
Sensors 2021, 21 (18), 6150.

Biographie - Dr. Tsveta Miteva completed her PhD at the University of Heidelberg, Germany, followed by postdoctoral studies at Sorbonne University in Paris, France. Since 2018, she has been a researcher at the French National Scientific Center (CNRS), stationed at the Laboratoire de Chimie Physique-Matière et Rayonnement (LCPMR). Her research primarily delves into the theoretical simulation of ultrafast electronic decay processes following inner-shell excitation and ionization in gas and liquid phases. Furthermore, she applies her expertise in Machine Learning and Artificial Intelligence to the field of cultural heritage as well as in the analysis of algal biomass components for biofuel production.