Exploring the frontiers of chemistry and the humanities for the safeguard of cultural heritage

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To preserve manuscript illuminations for future generations, my group is combining methods from the humanities and the natural sciences. This holistic approach results in an in-depth knowledge of the creative processes and techniques used, as well as the composition of materials and their deterioration processes.

In this presentation, I will focus on recent advances in the molecular characterization of colours used in medieval manuscripts and the challenges inherent in analyzing materials that are intrinsically heterogeneous. This approach provides the full paint "formulation" and an in-depth knowledge about the culture that produced these precious colours - which are centuries or even millennia - old [1, 2].

Case studies will be based on precious illuminated manuscripts that "have been considered as the most beautiful and original produced by the Medieval Western Civilization" such as the Lorvão Beatus (1189). My team contributed to the interdisciplinary chemical and historical research on the Manuscripts of the Commentary to the Apocalypse (Beatus of Liébana) in the Iberian tradition, which led to the successful entry of 12th century Portuguese Beatus into UNESCO´s Memory of the World Register. Pigment analysis combined with documentary evidence allowed a complete reinterpretation of the colour use and depiction of figures in Lorvão Beatus [3].

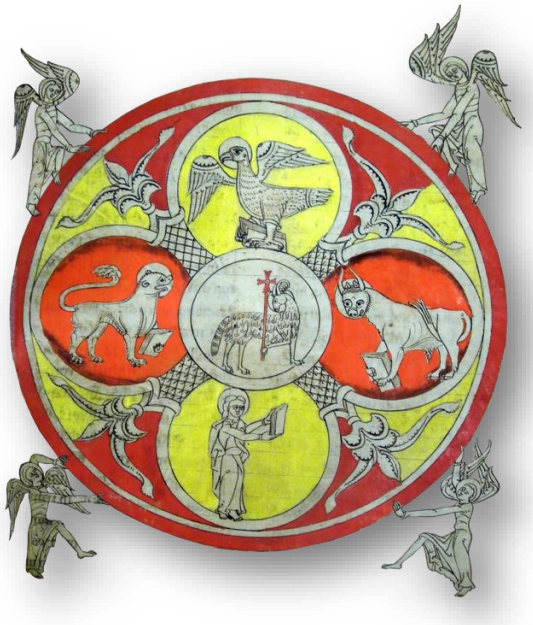

Figure 1. *Vision of the Lamb and the Four Living Creatures* (262 mm x 217 mm). Arquivo Nacional da Torre do Tombo, Liv. 44, fol. 90

[1] C. Miliani, L. Monico, M. J. Melo *et al.*, Angew. Chem. Int. Ed., 57 (2018) 7324-7334.
[2] M. J. Melo and A. Claro, Acc. Chem. Res., 43 (2010) 857-866.
[3] http://www.unesco.org/

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