Namur Institute of Structured Matter

Postdoctoral researcher position (18 months)

Project: Parchments & inks: a combined approach of analytical methods for investigating parchment degradation and ink composition (acronym: P&I).

Scientific domain: cultural heritage science.

Job announcement

The Namur Institute of Structured Matter (NISM), Belgium, offers an 18-months full-time post-doctoral researcher position in the field of cultural heritage science. The project is about **experimental studies on parchments and inks using a combined approach of analytical methods for investigating parchment degradation and ink composition**. The candidate must fulfill international mobility conditions (*) and possess already expertise in analytical methods used in physics, chemistry or biology. More specifically, the candidate should prove he or she has solid experience with at least one of the following analytical methods: Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS), X-Ray Diffraction (XRD) and Mass Spectrometry (MS) techniques applied to proteomic analyses. In addition to experimental skills, the candidate should show motivation to work in the field of cultural heritage science. The research will be carried out within the NISM and in collaboration with the Mass Spectrometry (MaSUN) platform of the University of Namur. Medievalists will collaborate on historical aspects related to manuscripts selection and sourcing.

The project will start ideally on 1st October 2020. The starting date could be shifted up to 1st February 2021 (at latest), depending on the candidate's availability. The project duration will be 18 months.

Application must be sent **from 1st September 2020 to 15st December 2020 to** Prof. Olivier Deparis, Prof. Laurent Houssiau, Dr Nikolay Tumanov **in a single email, including a letter of motivation, a curriculum vitae and two reference letters**.

To: olivier.deparis@unamur.be, CC: laurent.houssiau@unamur.be, nikolay.tumanov@unamur.be

(*) International mobility conditions require that the candidate has not resided or carried out his or her main activity (work, studies, etc.) in Belgium for more than 12 months in the 3 years immediately prior to the call deadline. All nationalities are eligible.

Brief description of the project

Manuscripts written on parchments are treasures of world's cultural heritage. Both the biological substrate (collagen) and the writing material (vegetal and mineral pigments) suffer from degradation over time, which may challenge their conservation for future generations. The general objective of the project is to develop a combined approach of analytical methods in order to investigate parchment degradation and ink composition. The acquired knowledge will be relevant to parchment conservation studies as well as to historical studies on writing medieval practices. We will use tandem mass spectrometry (MSMS) combined with ultra-performance liquid chromatography (UPLC) in order to track specific collagen degradation mechanisms, e.g. deamidation, induced by artificial ageing of parchments. By selecting ageing conditions carefully, we will search for specific degradation signatures in the peptide sequences and by performing complementary spectroscopic analyses, such as ToF-SIMS, we will detect signatures of these degradation mechanisms in order to strengthen our results obtained by mass spectrometry analyses. Regarding ink studies, we will perform ToF-SIMS analyses directly on manuscripts, instead of resorting to the commonly used XRF analysis. We will also use complementary non-invasive spectroscopic analyses in order to crosscheck our ToF-SIMS results and to verify the limited impact of ToF-SIMS analysis on parchment conservation state. We envisage to use, with due authorization, heavily damaged manuscript fragments. Fragments of such samples will be analyzed by XRD in order to determine the crystalline phases of pigments used in inks.

Any complementary information may be asked by email to Prof. Olivier Deparis (olivier.deparis@unamur.be)
Information about NISM can be found at https://directory.unamur.be/entities/nism