



CENTRE
DE RECHERCHE
SUR LA CONSERVATION



Internship Proposal 2026

Host laboratories

Centre de Recherche sur la Conservation des Collections (CRCC, Muséum National d'Histoire Naturelle)
Sciences et Ingénierie de la Matière Molle (SIMM, ESPCI Paris – PSL)
Institut Parisien de Chimie Moléculaire (IPCM, Sorbonne Université)

Internship supervisors

CRCC: Anne-Laurence Dupont, anne-laurence.dupont@mnhn.fr

SIMM: Théo Merland, theo.merland@espci.psl.eu

IPCM: Nathan Ferrandin-Schoffel, nathan.ferrandin-schoffel@sorbonne-universite.fr

Please apply by sending us a CV and a cover letter

Duration

6 months, starting in January, February, or March 2026

BIOREM: Formulation of bio-based consolidants to remedy the fragility of cultural heritage papers

Context

Preserving early modern industrial paper-based archival collections is a major challenge due to the mechanical fragility they exhibit, which is caused by the acidification that develops rapidly after production. A well-established solution is to neutralize the acids through a deacidification treatment. However, adding of a consolidant to the treatment to enable a safe handling of the documents while limiting irreversible material loss, is not a common practice. This is due to the lack of efficient, durable, and economically viable solutions. The CRC has developed a unique solution that combines deacidification and consolidation in a one-pot process, using aminoalkylalkoxysilane (AAAS) polymers. The drawback, from an eco-responsible perspective, is that AAAS are petroleum-based. More sustainable and environmentally friendly treatments should be developed.

Description of the project

The BIOREM project aims at developing eco-friendly, sustainable mechanical reinforcement treatments for fragile Cultural Heritage papers using bio-based polymers. Polymers carrying basic functional groups capable of deacidifying the paper will be chosen. Bio-based amino polymers (BAPs) such as chitosan, amino-dextran, and ϵ -polylysine, which have yet to be explored for paper conservation, will be tested. The eco-treatments, will be formulated to guarantee solutions that meet both conservation requirements and current ecological challenges. They will be characterized using physicochemical analyses (pH, mechanical and rheological properties, FTIR, NMR). The best performing formulations will be tested on archival papers within the BIOCORE doctoral project (DIM PAMIR).

Methods

Screening of formulations - performance and quality:

- Chemical modifications and formulations (e.g., grafting of BAP)
- Characterization of PBAs and their films (pH, FTIR, NMR, rheology, DMA, AFM)
- Exploratory assays and characterization of BAP/Microfibrillated Cellulose composite films

References

Ferrandin-Schoffel, N. et al. ACS Appl. Polym. Mater. 2 (2020) 1943–1953.

Adel, A. M. et al. J. Appl. Polym. Sci. 131 (2014) 40761.

Candidate profile

The selected candidate will be a student enrolled in a university in the Île-de-France region, pursuing a Master 2 degree in Polymer Chemistry, Organic Chemistry, or Materials Science, or will be attending an engineering school specializing in Chemistry.

The selection will be based on the following criteria:

- Knowledge (and preferably experience) in the physico-chemistry of polymers
- Familiarity with polymer structural characterization techniques
- Ability to work in a multidisciplinary team and across multiple laboratories (Paris 5th district)
- Proficiency in scientific English and strong writing skills
- Experience with biopolymers and a commitment to cultural heritage will be considered a plus