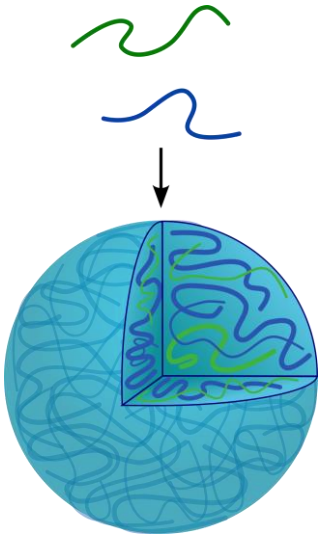
## PhD Position in Physical-Chemistry:
## Polypeptide coacervation towards the origins of Life
**(https://emploi.cnrs.fr/Offres/Doctorant/UMR5031-NICMAR-004/Default.aspx?lang=EN)**

## Bordeaux, France (starting October 1st)

**Project description:**

Coacervation – a process where macromolecules phase-separate into dense liquid-like droplets – has significant applications in a variety of fields, including drug delivery and biomaterials, and is also widely studied as a key phenomenon in the origins of life. This PhD project focuses on the formation and dynamics of peptide-based coacervates as model protocells, investigating how their properties depend on peptide length, sequence, and environmental conditions. We will first explore the minimal length and sequence requirements for peptide coacervation. Next, the project will assess how these coacervates influence the synthesis of polypeptides. In parallel, we will investigate whether polypeptide synthesis can directly trigger coacervation in situ, linking polymerization and phase separation. Finally, coacervate degradation via proteolysis will be studied, allowing us to establish dynamic cycles of coacervate growth and decay, selectively favoring the formation of specific polypeptides. By bridging physical chemistry, soft matter, polymer science, and prebiotic chemistry, this research will provide new insights into how dynamic compartmentalization could have influenced the early evolution of biomolecules.



*Assembly of peptide-based coacervates*

**Location:** The PhD candidate will work in two places: the "BioPhysicalChemistry" team of the CRPP (Centre de Recherche Paul Pascal, https://www.crpp.cnrs.fr/) in Pessac, France, under the supervision of Nicolas MARTIN (https://www.crpp.cnrs.fr/nicolas-martin/) and the team "Polymer self-assembly and life sciences" of the LCPO (Laboratory of Organic Polymer Chemistry, https://www.lcpo.fr/) in Pessac, France, under the supervision of Colin BONDUELLE (https://www.lcpo.fr/people/faculties/colin-bonduelle).

**Candidate profile:** The candidate will have a solid background in physical chemistry and soft matter. Skills in macromolecular chemistry would be appreciated.

**Starting date:** October 2025 (3 years)

**Allowance:** 2200 euros gross/month (PhD fellowship from ANR)

**Application:** Interested applicants should send a **Cover Letter** and a **detailed resume** (CV) to Nicolas MARTIN (nicolas.martin@crpp.cnrs.fr) and Colin BONDUELLE (colin.bonduelle@enscbp.fr).

**References:** a) N. Martin *et al., Small Methods*, **2023**, 7, 12, 2300496 ; b) N. Martin *et al.*, *Nat. Commun.*, **2023**, 14, 2606 ; c) C. Bonduelle *et al.*, *Angew. Chem. Int. Ed.* **2020**, 59, 2, 622-626 ; d) C. Bonduelle *et al., Angew. Chem. Int. Ed.* **2022**, 61, e202209530 ; e) C. Bonduelle *et al., ChemPlusChem* **2024**, e202300492.