



## Post-doc on thin film mechanics

### Context

*L'Oréal Recherche Avancée* is seeking to develop a robust and general methodology to characterize in a quantitative way the adhesion, and more generally the durability, of thin cosmetic films on skin. The SIMM laboratory and in particular Matteo Ciccotti and Costantino Creton have a combined extensive experience in the characterization of adhesive properties of soft materials[1-3], on the development of custom test procedures and on the analysis of the results. The objective of the post-doc is to develop a simplified test method usable for thin polymer films (20-50  $\mu\text{m}$ ) to characterize the adhesive and mechanical properties of the film on the substrate. The ultimate goal is to use such measurements to assess the resistance to wear and generally the durability of the film on the skin. It should be adapted to test real formulated cosmetic films containing pigments, waxes and other components.

### Scientific work

Given the characteristics of the film and its variable level of cohesiveness the two following general methods will be investigated to probe the interface between the substrate and the film:

- A test where the substrate is used to load the film (by stretching or contracting) while monitoring both the applied strain and stresses.
- A probe tack test where the probe is glued to the back of the film (surface exposed to air) in order to apply a tensile load to the interface.

These measurements can be eventually complemented by some standard peeling test, where the cosmetic film can be supported by a stiffer backing. This was shown to provide interesting complementary information on the role of nonlinear rheology of the cosmetic film [1,2,3].

### Seeked profile of the candidate

We are seeking a post-doctoral researcher with a background in soft mechanics or polymer science. The applicant must have a background in experimental mechanics and a knowledge of soft matter science (physical chemistry, material science or physics) is a strong plus.

### Practical details

The work will be carried out within the laboratory of Soft Matter Science and Engineering and start as soon as possible, but ideally in early January. It will be supervised by Prof. Matteo Ciccotti and Dr. Costantino Creton

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The project will be in collaboration with L'Oréal Recherche Avancée

**Duration and Salary level:** 1 year contract renewable once, at 2300 Euros/month net salary

### References

- [1] J. Chopin, R. Villey, D. Yarusso, E. Barthel, C. Creton, and M. Ciccotti, *Macromolecules* **51**, 8605 (2018).
- [2] P. Fourton, K. Piroird, M. Ciccotti, and E. Barthel, *Glass Structures & Engineering* **5**, 397 (2020).
- [3] C. Creton and M. Ciccotti, *Rep Prog Phys* **79**, 046601 (2016).