



**Postdoctoral Position at IMP laboratory
(Ingénierie des Matériaux Polymères, UMR CNRS 5223)**

Rheological Behavior of Silicone for Additive Manufacturing.

Context:

The project RAMSAI (Robotized Additive Manufacturing for Silicone assisted by an Artificial Intelligence) funded by the French National Research Agency (ANR) gathers 4 university laboratories: ICube (Manager, Strasbourg), PIMM (ENSAM-Paris) and IMP and ICBMS (Lyon). RAMSAI aims at providing a new production tool for additive manufacturing, particularly by Liquid Modeling Deposition (LMD) for silicone parts, offering better quality of 3D objects using artificial intelligence techniques.

In this framework, a postdoctoral position of 24 months is offered at the IMP laboratory (Ingénierie des Matériaux Polymères, <http://www.imp-umr5223.fr>) to start in February 2023. The IMP Laboratory has a singular position at national and international levels by integrating various scientific skills related to polymer science (Macromolecular chemistry, Rheology, Processing and Physics) in order to the establishment of structure-properties relationships.

Postdoctoral subject:

The objectives of the 24 months postdoctoral internship will be mainly:

- 1) Identifying the key examples of available silicones covering the material properties window which govern the LDM,
- 2) Deeply characterizing their rheological behaviors and extracting relevant parameters (viscoelastic behavior, yield stress, temperature effect, solidification kinetics...)
- 3) Modeling the behavior to predict the flow in the nozzle, shape stability after the die exit, layers welding and curing kinetics.
- 4) Collecting data from LDM experiments and streamlining it into a format readily used by AI-based monitoring and control.

This internship will take place mainly at the IMP laboratory, under the direction of René Fulchiron, and, to a lesser extent, at ICBMS laboratory (Institut de Chimie et de Biochimie Moléculaires et Supramoléculaires, Lyon) within the world-renowned 3d.FAB platform.

Profile:

The candidate should possess a PhD in polymer science with knowledge in rheology from both experimental and modeling aspects. Experience in additive manufacturing will be an advantage.

Contacts:

The CV and motivation letters have to be sent to René Fulchiron: rene.fulchiron@univ-lyon1.fr.

References:

- Courtial *et al*, Addit. Manuf., **28**, 50–57 (2019) <https://doi.org/10.1016/j.addma.2019.04.006>
Perrinet *et al*, Adv. Mater. Technol., **5**, N° 1901080, (2020) <https://doi.org/10.1002/admt.201901080>
Lopez *et al*, Prog. Addit. Manuf., **6**, 53–62 (2021) <https://doi.org/10.1007/s40964-020-00143-5>