

# Master or PhD for the modeling of a manufacturing line

## Project MARIUS

### ModélisAtion hybrIde d'une Unité de Séchage

The emergence of technologies and know-how in physical data acquisition and treatment gives rise to promising perspectives for industry. The coupling between simulation and statistical analysis powerful capacities on the one hand, and sophisticated instrumentation of production lines on the other hand makes available fast tuning of fabrication processes. The development of hybrid modeling is one encouraging option for a better handling of energetic, material or financial resources.

The MARIUS project is supported by the France Relance fund and the french National Research Agency (ANR). It's a collaboration between Lactips, a company located bewteen Lyon and Saint-Étienne, and the SPIN research center at Mines Saint-Étienne.

Lactips is manufacturing plastic free pellets from casein polymer to be used in place of regular plastic solutions. Casein polymer offers environmental advantages from their biodegradable properties. The pellets manufacturing process starts from a powder raw material and includes extrusion, hydraulic and pneumatic transport, and drying steps prior to conditioning. The physical processes at stake are sensitive to chemo-physical grains properties, as well as to fluid-solid interactions. The successful candidate will take an active part in the development of tools and methods to orient Lactips in a vast parameters' space.

The candidate will join the PMMG team at the SPIN center, which is devoted to the study of granular matter in various industrial environments. We develop theoretical, numerical and experimental tools for a better understanding of the collective behavior of a large ensemble of individual grains in a fabrication process.

The MARIUS project is recruiting for a 24-months position a young graduated professional at master or PhD level in the fields of fluid mechanics, granular flows, industrial processes, or physical data treatment, in order to :

- produce a physical modeling of the different steps in the Lactips manufacturing process;
- test the model predictions with the instrumentation of the production line;
- enrich the model with a coupling with the physical data acquisition.

Among the perspectives of this position we will pave the way for the development of a future digital twin of the manufacturing line. Lactips will enjoy the capabilities of an innovative predicting digital tool, and the SPIN center will use this opportunity to reinforce its expertise on these technologies.

For any information, please contact Dr. Guillaume Dumazer by email : [guillaume.dumazer@emse.fr](mailto:guillaume.dumazer@emse.fr)

