**GlaxoSmithKline Services/Project (GSK)**

Since 2010, the Chemical Engineering department has been carrying out collaborative projects and services with the company GSK.

Specialising in the experimental and numerical characterisation of stirred tank reactors, the department offers its expertise to companies wishing to improve their processes.

It is within this framework that the department has carried out several research projects with GSK, including:

**2009-2010**: "Characterisation of the hydrodynamics within formulation tanks used in the production of vaccines".

- Characterization of PIV hydrodynamics and design of a set of multi-scale prediction models for different geometries

**2010-2012**: " Study of liquid-solid two-phase flow in innovative designs of formulation tanks used in vaccine production " (RW First Post-Doc COCAFELS Project)

- Development of characterisation methods;

- Characterisation of the properties of a solid suspension of aluminium salts;

- Design and characterisation of a new tank design by PIV and CFD;

- Modelling of the solid suspension by CFD;

- Design of prediction models (Scale-Up and Scale-Down);

- Consideration and integration of industrial constraints.

**2012-2014**: "Study of the deposition and agglomeration of particles in flocculation tanks".

- Determination of operating parameters to avoid particle deposition and fouling of the tank.

**2012-2014**: "Characterisation in single-use Cultibag tanks (Sartorius)".

- Characterisation of hydrodynamics in the Cultibag bioreactor (Sartorius);

- Design of prediction models (hydrodynamic stress and suspension).

**2012-2017**: "Study of the constraints encountered in agitated tanks used in cell culture".

- Characterisation of culture tanks by CFD

- Modelling of the history of the constraints encountered by a cell during its culture in an agitated tank by a hybrid CFD/compartmentalised model;

- Development of a multi-scale extrapolation model to evaluate hydrodynamic stresses;

- Determination of optimal operating parameters.

**2015-2017**: " Consultancy - CFD expertise ".

- Scientific assistance in the numerical characterisation of filling processes

**2017-2018**: "Numerical study of Placebos representative of solid-liquid suspensions used in vaccine formulation".

- CFD modelling of suspension behaviour in industrial tanks;

- Determination of the sedimentation fronts of suspensions.

**2017-Today**: "Follow-up of the implementation of the stirred tank reactors developed during the COCAFELS project".

- Simulation and characterisation of the impact of design modifications due to the technical constraints of tank manufacturing;

- Optimisation of previously developed models;

- Scientific assistance in the choice of operating parameters