PhD position at IFP Energies nouvelles (IFPEN)

in *Industrial Biotechnology*

Metabolic modelling of Clostridium acetobutylicum for biomass valorisation

Through various research programs, IFP Energies nouvelles is now strongly involved in the development of bioprocesses to produce biofuels and bio-based chemical intermediates.

The optimization of bioprocesses requires a deep knowledge of the involved micro-organism. The metabolism of *Clostridium acetobutylicum*, a model organism used at IFP Energies Nouvelles, has gained understanding over the past few years, with the use of cutting-edge and dedicated genetic tools such as CRISPR-Cas9. The acquired knowledge can now be used to build *in silico* metabolic models that can predict the effect of genetic alterations on the micro-organism's fermentation capacities, to drive the carbon flux towards products of interest.

To establish an efficient metabolic model, the selected candidate will enrich the most advanced existing metabolic model using state-of-the-art omics techniques and newly acquired knowledge. The available gene-editing tools will be used to validate the approach employed, while their combination with new tools developed during the thesis will allow to redirect the flow of carbon in this micro-organism, with the aim of producing metabolites of interest in the field of bio-based chemistry.

The successful candidate must have a research master's level with a specialization in biotechnology, microbiology and/or bioinformatics.

Keywords: Genetic engineering, anaerobic microbiology, Fermentation, *Clostridium*, metabolic modelling,

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IFPEN supervisor	Dr François WASELS, francois.wasels@ifpen.fr, ORCID : 0000-0002-4641-0270
PhD location	IFPEN, Rueil-Malmaison, France
Duration and start date	3 years, starting in the fourth quarter 2024 (November 4)
Employer	IFPEN
Academic requirements	Five years of higher education (engineering school or master's degree) with a specialization in biotechnology, molecular biology, or biological engineering.
Language requirements	English level B2 (CEFR)
Other requirements	Initial professional experience (fixed-term contract, permanent contract) in the research field would be a plus. Skills in microbiology, molecular biology, genetics, and bioinformatics. Knowledge in computer programming (Python, MATLAB, R) and fermentation engineering would be a plus.

To apply, please send your cover letter and resume including references to the IFPEN supervisor indicated here above.

About IFP Energies nouvelles

IFP Energies nouvelles is a French public-sector research, innovation, and training centre. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see our WEB site.

IFPEN offers a stimulating research environment, with access to first in class laboratory infrastructures and computing facilities. IFPEN offers competitive salary and benefits packages. All PhD students have access to dedicated seminars and training sessions.