

ESR 8 | Impacts of high pressure for efficient biomolecules production from CO₂: from reactor design to microbial physiology

ORGANISATION

With 14,000 alumni present in all economic sectors, the "**Institut National des Sciences Appliquées**" of Toulouse, an international, pluridisciplinary, state engineering school, is recognised for the excellence of its five-year education which attracts students of a high academic level. The international dimension has been a priority for INSA since it opened and international sections have gradually been set up. On campus, one in five students is an international student.

The position we offer will be embedded at the Toulouse Biotechnology Institute (TBI) within the research group Fermentation Advances and Microbial Engineering (FAME). With its highly developed competences in Life Sciences and Engineering Sciences, TBI implements a scientific strategy that is multi-scale, multidisciplinary and interdisciplinary in order to take up the challenges of bioeconomics with a worldwide collaborative network of public and private contributors (http://www.toulouse-biotechnology-institute.fr/en/presentation_of_lisbp.html). Research activities of the FAME group focus on kinetic and stoichiometric studies of microbial transformations in order to identify the phenomena which limit the performances of biotechnological processes (<http://www.toulouse-biotechnology-institute.fr/en/research/microbial-engineering/fermentation-advances-and-microbial-engineering--ead8.html>).

ROLES AND RESPONSIBILITIES

The main part of your PhD research (3 years) will be carried out at **INSA Toulouse** under the supervision of **Prof. Dr. Stéphane Guillouet** in the FAME group at the Toulouse Biotechnology Institute. Within these three years an academic research stay (6-7 months) will take place at the **Rheinisch-Westfälische Technische Hochschule Aachen (RWTH, Germany)** under the supervision of **Prof. Dr. Lars Blank**. Additionally, an industrial secondment at the company **SUEZ Groupe (France)** is foreseen. The H2020 Marie Skłodowska-Curie Actions (MSCA) – Innovative Training Network (ITN) project starts in January 2021. The date of recruitment and start of the PhD project is planned for May 2021 and latest on December 2021. Your **PhD degree** will be awarded based on successful completion of the research work **from two universities** (INSA, France and RWTH, Germany). You will also be required to participate in the **training events and workshops** organized by the ITN-European Joint Doctorates (EJD) program. As a Marie Skłodowska-Curie Actions (MSCA) fellow, you are also expected to **contribute your time in the dissemination of your PhD project's result** through public engagement and other scientific platforms.

The PhD research will be part of the Work Package 3 "Process intensification of gas-driven processes" of the ConCO₂rde project aiming at deciphering the bottlenecks at the technological levels in order to run gas fermentations at high cell densities within pressurized bioreactors in order to speed up the development of the future bioprocess from CO₂ as unique Carbon source.

The ESR8 PhD research will focus on the physiology of *Cupriavidus necator*, under autotrophic conditions and elevated pressure within gas bioreactor for the production of isopropanol:

- (i) Interdisciplinary project on system biology, metabolic engineering, fermentation
- (ii) Strain engineering for the synthesis of isopropanol,
- (iii) Characterization of engineered strains in pressurized bioreactor under autotrophic conditions,
- (iv) In-depth analysis of the bacterial metabolism (academic secondment)
- (v) Gas transfer performance with industrial gases with the industrial partner.

First supervisor: Prof. Stéphane Guillouet (guillouet@insa-toulouse.fr)

Recruiting Institution: INSA Toulouse (France)

Double degree awarding institution: Rheinisch-Westfälische Technische Hochschule Aachen (RWTH, Germany)

REQUIREMENTS

- An outstanding M.Sc. degree in Biochemical engineering, Biotechnology, Biochemistry or related field
- Eligible as a graduate student at INSA Toulouse, France
- Research experience in fermentation (bioreactor, microbial kinetics), analytical methods (HPLC, GC, MS, NMR etc.), biochemistry (e.g. protein expression and characterization)
- Ability to work in an international team,
- Inter- and multidisciplinary thinking,
- High motivation,
- An integrative and cooperative personality with excellent communication and social skills,
- Fluency in English – written and oral.

CONDITION OF EMPLOYMENT

We offer you a work contract in accordance with the Collective Labour Agreement for French Universities. The salary will range within € 3 783 to € 4 383 pre-tax per month depending on the personal situation. The full time appointment is temporary for a specified period of three years. The preferred starting date is between May 1st and October 1st 2021.

APPLICATION PROCEDURE

To apply for the position, kindly provide:

- (i) A letter of motivation including a statement of your research interests, relevant skills and experience;
- (ii) A CV including publication list; and
- (iii) Names and contact details of three referees willing to write confidential letters of recommendation.

Please upload applications only according to instructions at www.conco2rde.eu.

We are an equal opportunity employer and value diversity at our University. We are committed to building a diverse faculty so you are encouraged to apply. Our selection procedure follows the guidelines of the Recruitment code and European Commission's: European Code of Conduct for recruitment of researchers.

APPLICATION DEADLINE

31st of January 2021 11:59pm Central European Time



Innovative Training Network – European Joint Doctorates

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