DN-MSCA-Horizon Europe
Grant n°101119277

In the frame of the Doctoral Network MSCA Horizon Europe "ChimSep" dedicated to the integration of membrane separations (Organic solvent nanofiltration and membrane distillation) in fine chemistry, 13 PhD projects are funded for 36 months: 8 dealing with membrane science and 5 dealing with homogeneous catalysis.

See all the 13 projects at https://theses.doctorat-bretagneloire.fr/dn-chimsep

Title- PhD#13: Advanced process monitoring by on-line mass spectrometry and advanced mathematical modelling in membrane distillation applied to transfer hydrogenation of furfural in ethanol
Joint doctorate

Offer description

PhD#13 will study the membrane distillation (MD) advanced process monitoring using on-line mass spectrometry (MS) for real-time measurement of concentration of gaseous compounds of transfer hydrogenation of fufural reaction mixture and mathematical modelling of transfer.

At University NOVA Lisbon (Portugal, 22 months) **PhD#13** will develop a set-up for monitoring the MD thanks to on-line MS. He/she will have to found appropriate on-line sampling of the volatile compounds of the reaction mixture (VOC) using a split-line that conveys the gas phase to the MS chamber. This procedure accomplished on-line, will make possible to acquire the composition of the permeate VOC in real-time with one data-point per second allowing to capture the behaviour of the membrane at steady& transient states, providing information useful for transport modelling and validated under close-to-real conditions.
At UMK University of Torun (Poland,12 months) PhD#13 will continue the work initiated by Membranologist **PhD#5** of the doctoral network dealing with MD on olefin metathesis inducing cross-feedback between the 2 PhDs. **PhD#13** will have feedbacks with Chemist **PhD#8** of the doctoral network working on transfer hydrogenation of furfural, Membranologist **PhD#9** studying organic solvent nanofiltration (OSN) on transfer hydrogenation of furfural and **PhD#5 & PhD#12** of the doctoral network working on MD. Depending on the MD performances, fractionation processes will be suggested either based on single MD or hybrid process. The preparation of the PhD thesis and defence will be finalized at University NOVA Lisbon.

PhD#13 will spend 2 months at ***Boccard*** to acquire a better knowledge on process design for industrial applications.

Keywords:

Membrane separation, membrane distillation, homogeneous catalysis, modelling, mass spectrometry, on-line monitoring

PhD starting date: 01/11/2023

Application deadline: 31/08/2023 (23:59:00, Paris)

https://theses.doctorat-bretagneloire.fr/dn-chimsep

Work location: Lisbon, Portugal (two years) & Torun, Poland (one year)

The Doctoral Candidate will be enrolled in a joint doctorate between two partners of the network. He/she will spend 20 months with the hosting partner (NOVA University, Lisbon, Portugal) of the present application and then a mobility of 12 months at UMK University of Torun, Poland.

During the doctoral period, the PhD will also spend 2 months at ***Boccard, France*** to acquire a better knowledge on process design for industrial applications

Contacts

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Thesis second supervisor (Poland)
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Required Education Level : Master degree or equivalent

Skills/Qualifications

The candidate will hold a Master degree or equivalent in chemical engineering or in chemistry with competencies in processes and/or membrane processes.
A previous experience in handling membrane processes will be appreciated as well as knowledge in membrane material science.
Knowledge of analytical characterization techniques, in particular mass spectrometry will be appreciated
Enthusiasm, autonomy, scientific curiosity and ability to communicate are required qualities.

Required Language: English, level: Good

Required research experience

An internship of several months in a research laboratory involved in membrane separation and/or mass spectrometry will be appreciated

Website for additional job details;

See application platform: https://theses.doctorat-bretagneloire.fr/dn-chimsep
section “Présentation de l’école doctorale » (doctoral network presentation)

Salary

The EU provides support for each recruited researcher in the form of

- Gross salary per month : close to 2 002 € (net should be around 1 593 €) , an additional annual premium could be paid
- + 600 € of mobility allowance. All eligible researchers recruited within a DN are entitled to receive this allowance. It contributes to the private mobility related expenses of the researcher.
- + 495 € of family allowance per month (if eligible to the conditions: be married or equivalent and/or have a child; family, long-term leave and special needs allowances. The family status of a researcher will be determined at the date of their (first) recruitment in the action and will not evolve during the action lifetime.