

## PhD in Organic Chemistry – Domino Reactions/Organocatalysis

“Synthèse Stéréosélective d’Hétérocycles Azotés par Réactions Monotopes Domino”

“Stereoselective Synthesis of aza-Heterocycles employing Domino One-pot Processes”

Offer type: Thesis

Contract: Université Le Havre Normandie

Salary: ca .1400 € netto/month

Recruiting organization: Université Le Havre Normandie

Workplace: Le Havre (76)

Skill area: Chemistry – Organic chemistry

Contacts: [catherine.taillier@univ-lehavre.fr](mailto:catherine.taillier@univ-lehavre.fr), [sebastien.comesse@univ-lehavre.fr](mailto:sebastien.comesse@univ-lehavre.fr)

**Recruiting organization:** URCOM (Unité de Recherche en Chimie Organique et Macromoléculaire) is located at the Université Le Havre Normandie and involves around 35 people (about 15 permanent researchers and 20 PhD students and post-doc fellows). This project will be supported by Le Havre Normandy’s University.

### Subject of the thesis:

A PhD position is available at URCOM Laboratory (Université Le Havre Normandie).

Our research focuses on the transformation of simple and inexpensive substrates, using soft and environmentally friendly conditions, into a vast library of compounds with higher added value. In particular, we currently have a strong interest in the development of new enantioselective domino/one-pot processes for the synthesis of highly tunable *N*-heterocyclic compounds. This Research work will be based on previous results obtained in Le Havre concerning the synthesis of racemic lactams from common substrates, *i.e.* Michael acceptors and acrylamides (see publication (a) cited below).

More recently, we have investigated the enantioselective synthesis of  $\delta$ -lactams starting from Michael acceptors and *N*-alkoxy acrylamide derivatives employing chiral organocatalysts. Even though this process is efficient and allows the formation of the desired cyclic products in good yields and high enantioselectivities, the scope remains limited in terms of substrates. We now wish ***to expand our methodology to N-alkoxy acrylamides and demonstrate their potential as trifunctional cascade partners*** ( $N$  et  $C_{\alpha}$ -sp<sup>2</sup> bis-nucleophile /  $C_{\beta}$ -sp<sup>2</sup> electrophile) for the synthesis of poly-substituted enantioenriched  $\delta$ -lactams. The proposed methodology should thus provide a straightforward access to cyclic or bicyclic systems bearing up to 5 contiguous stereogenic centers. Moreover, a special focus will be given to the potential applications of these products in medicinal chemistry, by probing their biological profiles

**Keywords:** *one-pot and domino reactions, N-heterocyclic chemistry, organocatalysis, asymmetric synthesis, structure-activity relationships or biological activities*

### Recent related publications:

- (a) P. Champetter, O. Castillo-Aguilera, C. Taillier, J.-F. Brière, V. Dalla, S. Oudeyer, S. Comesse *Eur. J. Org. Chem.* **2019**, 7703-7710. (b) El Bouakher, A.; Tasserie, J.; Le Goff, R.; Lhoste, J.; Martel, A.; Comesse, S. *J. Org. Chem.* **2017**, 82, 5798. (c) El Bouakher, A.; Le Goff, R.; Tasserie, J.; Lhoste, J.; Martel, A.; Comesse, S. *Org. Lett.* **2016**, 18, 2383. (d) Le Goff, R.; Martel, A.; Sanselme, M.; Lawson, A. M.; Daïch, A.; Comesse, S. *Chem. Eur. J.* **2015**, 21, 2966.

**Candidate Profile:**

The candidate should hold a master degree in organic chemistry at the start of the position. He/She should have a strong background in organic synthesis and characterization methods (NMR, GC, MS, HPLC, etc). An experience in catalysis and/or handling of sensitive compounds under inert atmosphere will be appreciated.

The expected qualities of the candidate are high motivation for research, good communication skills and the ability to work safely and independently in a team.

To apply, please send a detailed CV, a cover letter, academic transcripts and rankings of the past two years and contact details of two referents before July, 1<sup>st</sup> 2021.