

Research Topic for the ParisTech/CSC PhD Program

Field: Chemistry

Subfield: Organic chemistry

Title: Aromatic fungal polyketide synthesis: when bio-inspiration meets C–H activation

ParisTech School: ENSTA ParisTech

Advisor(s) Name: Sébastien Prévost

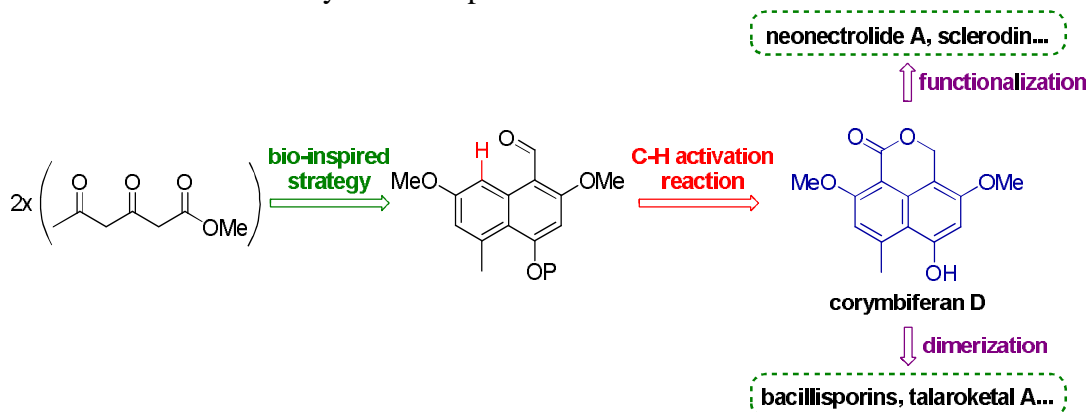
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(Lab, website): <https://portail.polytechnique.edu/lso/en/research-groups/asymmetric-catalysis-and-natural-product-synthesis>

Short description of possible research topics for a PhD:

Polyketides are an important class of highly biologically active secondary metabolites. A lot of antibiotics or antitumor agents are derived from polyketides. Due to the antibiotic resistance problem, the synthesis of new biologically active compounds is crucial.

Corymbiferans are aromatic fungal polyketides bearing a characteristic naphthol ring annulated with a 6-membered lactone. This skeleton is commonly found in fungal polyketides, as monomeric or dimeric natural products exhibiting remarkable biological properties. The objective of this PhD will be to combine bio-inspired synthesis of naphthols with C–H activation reactions to develop an approach to corymbiferan D. In addition, new catalytic reactions related to naphthalenes C–H activation will be studied. After that, the corymbiferan intermediate will be used to obtain some very complex natural products (neonectrolide A or talaroketal A). This work will be done in collaboration with biologists to evaluate the activities of the synthesized products.



Required background of the student: The student should have a strong background in organic chemistry, catalysis and total synthesis. Additionally, knowledge in analytical chemistry is required.

A list of 5(max.) representative publications of the group:

- (1) Prévost, S.; Dezaire, A.; Escargueil, A. *J. Org. Chem.* **2018**, *83*, 4871-4881.
- (2) Dolè Kerim, M.; Jia, S.; Theodorakidou, C.; Prévost, S.; El Kaïm L. *Chem. Commun.* **2018**, *54*, 10917-10920.
- (3) Tsuji, N.; Kennemur, J. L.; Buyck, T.; Lee, S.; Prévost, S.; Kaib, P. S. J.; Bykov, D.; Farès, C.; List, B. *Science* **2018**, *359*, 1501-1505.
- (4) Prévost, S.; Dupré, N.; Leutzsch, M.; Wang, Q.; Wakchaure, V.; List, B. *Angew. Chem. Int. Ed.* **2014**, *53*, 8770-8773.