**Intitulé du Sujet de Thèse**: Enantioselective Synthesis and Chiroptical Studies of [n]Heterohelicenes

**Laboratoire**: Institut des Sciences Moléculaires de Marseille (iSm2)

**Equipe STeRéO**

**Directeur de thèse**: Jean RODRIGUEZ

**Starting date**: 01/10/2020

Applications are welcome until **20/04/2020**

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**Context**

Helicenes are ortho-fused polycyclic aromatic compounds in which all are angularly arranged so as to give helically shaped molecules, which induces an helical chirality.\(^1\) Compared to carbohelicenes, the presence of one or more heteroatoms in a chiral non-racemic helix induces structural modifications, significantly affecting their configurational stability and usually resulting in enhanced or more specific properties. Hence, hetero[n]helicenes revealed as promising scaffolds for numerous recent developments such as catalysts design and their utilization in enantioselective reactions, molecular recognition, material science and some biologically active agents. However, these developments are hampered because of the lack of general synthetic approaches to optically active derivatives. Therefore, both the design of innovative and widely applicable enantioselective strategies to access various families of chiral non-racemic π-conjugated hetero[n]helicenes, are highly desirable.

**PhD project**

Our research group recently developed conversion of chirality strategies for the control of axial chirality.\(^2\) The goal of this PhD project is to design and develop enantioselective synthetic strategies towards [n]heterohelicenes relying on the combination of organocatalysis with conversion of chirality. In addition to the enantioselective synthesis of the hetero[n]helicenes, a part of the PhD will be devoted to their physical and chiroptical studies. Chromatography on chiral support, chiroptical spectroscopies, DFT calculations and single crystal X-ray diffraction will be combined to obtain and to characterize the enantiomers.

**PhD profile**

The position requires a solid at least six-month training in organic synthesis for a student with a Master degree obtained with distinction. We are looking for a rigorous, strongly motivated and enthusiastic candidate with good knowledge in synthetic organic chemistry and being research dedicated and curious. Experience in enantioselective organocatalysis would be appreciated. **Candidates should send** a CV, a motivation letter and the contact of at least one referee.

**References**

1) C.-F. Chen et al. in *Helicene Chemistry: From Synthesis to Applications*: Springer: Berlin, **2017**.

For details about our research group, see: [http://ism2.univ-amu.fr/fr/stereo/stereo](http://ism2.univ-amu.fr/fr/stereo/stereo)