## Internship Subject Form

### Name of the Host Laboratory
Molecular Chemistry Laboratory

### Website of the Host Laboratory
https://portail.polytechnique.edu/lcm/fr

### Research Group

### Internship Supervisor
Dr. Audrey Auffrant

### Internship Subject
Catalysis with cooperative ligands

### Student’s level
- ☑ Advanced Undergraduate Students (3<sup>rd</sup> or 4<sup>th</sup> year)
- ☑ Master’s students (1<sup>st</sup> or 2<sup>nd</sup> year)
- ☐ PhD students

### Proposed Duration
- ☑ 3 months
- ☑ 4 months
- ☑ 5 months
- ☐ 6 months

### Prerequisites
Knowledge in organic chemistry or organometallic chemistry

### Internship description (max. 15 lines):
**Cooperative catalysis**

With the aim to develop efficient and selective catalysts which corresponds to the societal demand for more sustainable chemistry, we are specialized in the synthesis of original phosphorus based ligand and the study of their coordination to various metals. To achieve catalysis with cheap and abundant metals, one of the successful strategies is to associate this metal with proton responsive cooperative ligand allowing the catalytic system to store and release H<sub>2</sub> depending on the reaction conditions (see hereafter). This so called borrowing hydrogen strategy allows synthesizing sophisticated molecules from alcohols. Based on the experience of the Laboratory the preparation of ligands, complexes and their use in catalysis will be conducted. The student will learn to handle sensitive chemicals, characterize organic and organometallic molecules with multinuclear NMR spectroscopy, and grow single crystals for X-ray diffraction analysis. The catalytic trials will be most probably followed by GC analysis.