



*Innovation*



UNIVERSITAT ROVIRA I VIRGILI

## LECTURE SCHEDULE

Training Course

### ASYMMETRIC HYDROGENATION

**Professor Montserrat DIÉGUEZ**  
(Universitat Rovira i Virgili, Tarragona, SPAIN))

1-Day training

# Day 1

## 9h00-10h30 **Lecture 1: Asymmetric hydrogenation of functionalized olefins**

- Introduction
- Evolution on the design of catalysts
- Key catalyst/ligand parameters for high selectivity.
- Mechanistic studies

10h30-10h45 Coffee break

## 10h45-12h15 **Lecture 2: Asymmetric hydrogenation of unfunctionalized olefins or with poorly coordinative groups**

- Introduction
- Catalysts design and key ligand parameters for high selectivity
- Mechanistic studies

12h15-14h00 Lunch

## 14h00-15h30 **Lecture 3: Asymmetric hydrogenation of imines and ketones**

- Introduction
- Evolution on substrate types and catalyst design
- Mechanistic studies
- Asymmetric hydrogenation of (un)functionalized olefins and imines vs. ketones

## 15h45-17h15 **Lecture 4: Asymmetric hydrogenation in industry**

- Analysis of patents in asymmetric hydrogenation (homogeneous and heterogeneous catalysts)
- Cost efficiency of a process. Many factors e.g. catalyst price, TON, TOF, robustness to impurities in the feedstock, cost of the substrate, etc, catalyst loading...
- Moving from Rh, Ir to Ru and to non precious metals
- Evolution and application of continuous flow chemistry in asymmetric hydrogenation
- Collection of relevant examples of industrial application

## Conclusion and perspectives