

# UE Evo Devo and the green lineage



ECTS  
6 credits



Component  
UFR Chimie-  
Biologie



Semester  
Tous les ans

- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** YAX9BI18

## Presentation

### Description

#### Course outline

The main theme of this course is centred on how regulatory networks and specific patterns of gene expression shape development and have evolved in animal and plant kingdoms.

On the animal side, you will hear about basic concepts of early evolution of metazoan development and body plans in Arthropods, we will analyse the role of neural crest in vertebrate segmentation and head patterning, and discuss developmental mechanisms of evolutionary change.

On the Plant front, developmental genetics of plant speciation, evolution of flower development, and molecular mechanisms generating flower diversity and underlying plant domestication will be the major topics.

Overall, this Evo-Devo course will give an overview, through the examples of various developmental models, of how shaping/reshaping of genes and genomes drove the diversity represented along the tree of life and conducted to present-day organisms living on earth.

The teaching team consists of local, national and international specialists in their field who will present the topics they are passionate about.

#### Lectures (15)

## 1) General introduction (2 lectures)

What is Evo-Devo:

- Introduction to Evolution of Developmental Genes
- Evidences for evolution of developmental genes in animals and plants

## 2) Animal Evo-Devo (6 lectures)

- An overview of animal clades and patterns of Development
- Evolutionary dynamics of zygote gene activations
- Conservation of gene regulation circuits in Evolution
- Cranial ganglia patterning in vertebrate development
- Molecular basis of placodes development in Vertebrates
- Male genome reprogramming: What have the mice taught us?

## 3) Plant Evo-Devo (6 lectures)

- The Phylogeny of Chloroplasts
- Retrograde signalling networks in the regulation of development in eukaryotes
- The mysterious origin of the flowering plants
- Evolution of floral symmetry and epigenetics
- Combining next generation Evo-Devo with new model organisms to study plant-pollinator interactions.
- Plant Evolution and Domestication

## 4) Concluding/Overview lecture (1 lecture)

Plant and Animal Genome Plasticity in Evolution

## **Tutorials (12)**

Tutorials consist in analyses of scientific publications by students. The articles are in direct connection to the lectures/seminars. They are given to the students a week in advance. Students highlight the messages of the articles via analysis of the main figures/results. They present the state-of-the-art and the objectives of the study as an introduction, then the approaches employed to answer the questions, the main results and their driven-conclusions, and finish with perspectives of the presented work. Article analysis is followed by a discussion with the Professor and all students of the class.




---

## Course parts

UE Evolution and development of Eukaryotes - CM	Lectures (CM)	22,5h
UE Evolution and development of Eukaryotes - TD	Tutorials (TD)	18h

**Period** : Semester 9

---

## Skills

After this module, the students should be able to:

1. recapitulate the main innovations that drove developmental patterning in both the animal and plant kingdoms, as illustrated through models described in the lectures;
2. describe some important networks/key factors (genetic and epigenetic) involved in development and evolution;
3. explain an experimental strategy used in a scientific study, analyze results and conclude from them on the key discoveries;
4. be critical about questions addressed by a study, as well as approaches, in link with the state-of-the art;

5. be able to propose experimental strategies to answer questions related to development and evolution.

## Useful info

---

### Contacts

Program director

**Christel Carles**

✉ [Christel.Carles@univ-grenoble-alpes.fr](mailto:Christel.Carles@univ-grenoble-alpes.fr)

---

### Place

› Grenoble

---

### Campus

› Grenoble - University campus