

**Rocks & Bones : climate and life co-evolution**

Joint Summer  
School - Université  
de technologie de  
Compiègne (France)

**07.13 to 07.17 2026****at the université de technologie de Compiègne****TOPIC DESCRIPTION**

Life evolved billions of years ago under very different climatic conditions than those we know today. Since its origin, from a common ancestral group of cells, evolution has driven the remarkable diversification of organisms, reaching the extraordinary number of species our planet hosts today. This biodiversity, unique to Earth, is critical for human survival: other organisms are responsible for many of the essential processes that sustain us, from producing the oxygen we breathe to providing the food we eat. Climatic conditions play a fundamental role in the evolution of life. Changes in temperature and precipitation create environmental stresses that can drive the extinction, migration, or evolution of millions of species throughout our planet's history, including our own species, *Homo sapiens*. Everything is connected. Biodiversity depends on climate, and climate itself has been shaped by the metabolism of living organisms since the very beginning of life. Human activities that modify climate, biodiversity, or both are therefore likely to have profound consequences on the planet's equilibrium and certainly on our own lives.

Regardless of our profession, age, gender, or nationality, we are all concerned with preserving our planet and protecting it from irreversible environmental change.

**MAIN LEARNING OBJECTIVE**

The principal goal of this course is to better understand the consequences of human-driven climate perturbations, through the study of the major environmental and biological changes that have occurred throughout Earth's history. The deep interactions between climate and life will be explored and highlighted through the analysis of critical evolutionary moments our planet has experienced, such as the Great Oxidation Event, the Cambrian Explosion, and the Permian Mass Extinction.

**INTENDED LEARNING OUTCOMES**

By the end of this course, students will be able to:

- Explain how evolution has driven the diversification of life from a common ancestral group of cells to the extraordinary biodiversity we see today
- Analyze the bidirectional relationship between climate and life, how climate shapes evolution, and how living organisms in turn shape climate
- Examine key turning points in Earth's history

## INDICATIVE CONTENT

- Biodiversity gradients
- Mechanisms of evolution
- Climate and biodiversity interactions
- Human impact on climate and biodiversity

## LEARNING METHODS

This course employs complementary learning methods designed to engage students from diverse academic backgrounds.

- Lectures (2-3h per session)
- Analysis of state-of-the-art scientific publications
- Group discussions and debates
- Oral presentations



## PROGRAM

| Monday<br>(13/07/2026)       | Tuesday<br>(14/07/2026) | Wednesday<br>(15/07/2026)    | Thursday<br>(16/07/2026)     | Friday<br>(17/07/2026)       |
|------------------------------|-------------------------|------------------------------|------------------------------|------------------------------|
| 9h-10h<br>Presentation       | Day off                 | 9h-10h<br>Lecture            | 9h-10h<br>Lecture            | 9h-10h<br>Oral presentation  |
| 10h-12h<br>Lecture           |                         | 10h-12h<br>Lecture           | 10h-12h<br>Debate            | 10h-12h<br>Oral presentation |
| Lunch                        |                         | Lunch                        | Lunch                        | Lunch                        |
| 14h-17h<br>Practical session |                         | 14h-17h<br>Practical session | 14h-17h<br>Practical session | 14h-17h<br>Oral presentation |

## ABOUT ADRIAN TRONCOSO-PONCE

Adrian Troncoso-Ponce is Associate Professor (Maître de Conférences) at the université de technologie de Compiègne, within the Enzyme and Cell Engineering Unit (GEC). He has conducted research in plant biology across Europe, at the Spanish National Research Council (CSIC) and at the French National Research Institute for Agriculture, Food and Environment (INRAE), and in the United States, at Michigan State University (MSU). His work has focused on plant metabolism, including central carbon pathways and the interactions between the circadian clock and lipid synthesis. Beyond plant biochemistry, he maintains a broad scientific interest in the interactions between life and environment throughout Earth's history.



## ABOUT THE UNIVERSITÉ DE TECHNOLOGIE DE COMPIÈGNE

Established in 1972, the université de technologie de Compiègne (UTC) is both a French national university and an engineering school, with autonomous training and pedagogy and an innovation-intensive, interdisciplinary technological research programme. UTC is regularly ranked top of the 'best engineering schools' in France. UTC produces graduates (engineers, Master's degree, PhDs) capable of taking into account the interactions of technologies with Society at large and of evolving in a world-scale competitive environment, with the aim of complying with sustainable development policies. The UTC lecturers, research scientists and engineers «lend meaning to innovation», enabling the emergence of new axes underpinning this concept, introducing entrepreneurship principles in the heart of their concerns.

