

Bacterial Genetic : from Evolution to Engineering

Organizer: Aude bernheim, aude.bernheim@inserm.fr
Arnaud Gutierrez, arnaud.gutierrez@inserm.fr

The goal of the module is to give a broad view of the field of microbial genetics today, through talks of scientists working on diverse subjects. The idea is to focus on novel and recent themes of the field. Days are organized to get the big picture through an introductory class summarizing the main concepts on a specific topic and then dive into recent work through researchers presenting in depth their work. The main themes include phages, evolution, synthetic biology, single cell heterogeneity and ancient DNA. Researchers both from academia and the private sector will give seminars, allowing students to also discover research outside the academic world.

Students will be evaluated on providing a written synthesis of the week (similar to what could be asked by a PI after a student attends a conference) that will be written on the last afternoon.

Lundi 18 octobre: Phages and anti-phage systems

9h30-12h30 Aude Bernheim, INSERM

Phages, the viruses of bacteria and how bacteria fight back

13h30-15h David Bikard, Pasteur Institute

CRISPR: From a bacterial immune system to genome editing technologies

15h30-17h Anne Chevallereau, Institut Cochin

Coevolution between phages and bacteria: the case of CRISPR-Cas systems and anti-CRISPR proteins

Mardi 19 octobre : Evolution

9h00-12h00 Olivier Tenaillon, INSERM

Experimental evolution

13h-14h15 Jorge André Sousa, Pasteur Institute

Microbial evolutionary Genomics

14h30-15h45 Laura Gomez-Valero, Pasteur Institute

Role of horizontal gene transfer in bacterial genome evolution

16h - 17h15 Ingrid Lafontaine, IBPC

Gene evolution and creation of new functions

Mercredi 20 octobre: Synthetic biology

9h30-12h30 Arnaud gutierrez Institut Cochin

bacterial synthetic gene circuits and their applications

13h30-15h Antoine Decrulle, Eligobiosciences

Synthetic Biology for microbiome editing

15h30-17h Helena Shomar, INSERM

Exploring the world of natural products through synthetic biology: a metabolic engineering approach

Jeudi 21 octobre: Single cell

9h30-12h30 Benoit Chassaing Institut Cochin

Microbiote evolution

13h30-15h Guilia Manina Pasteur Institute

Single-cell dynamics of DNA damage response in mycobacteria by time-lapse microfluidic microscopy

15h30-17H Imane El-Meouche, INSERM

Cell to cell heterogeneity within bacterial populations: in vitro and in vivo consequences

Vendredi 22 octobre

9h30h-12h30 Nicolas Rascovan, Pasteur Institute

Ancient DNA

14h-17h Test