

## **8<sup>th</sup> FISABIO Summer School: Molecular Epidemiology, from Outbreaks to the Global Spread of Pathogens**

**Dates: June 25<sup>th</sup> - June 29<sup>th</sup> 2018**

**Organizer: Fernando González-Candelas**

The course is addressed to graduate students, professionals and practitioners of biology, biomedical research and the health sciences. Some background in molecular evolution and phylogenetics, population genetics and molecular biology will be advantageous, but it is not required.

This course will provide an introduction to the concepts and methods of molecular population genetics and evolution applied to specific problems in the short, medium and long-term evolution of infectious microorganisms. Molecular epidemiology is an emerging discipline in the interface between molecular biology, population and evolutionary genetics, and traditional epidemiology, interested in providing a perspective on population and epidemic processes from the perspective of the infectious organism. From the origin of new pathogens to the sources of outbreaks or more detailed surveillance, there is an increasing number of uses for molecular epidemiology approaches which practicing epidemiologists should become familiar with. This course provides an excellent opportunity for breaking the initial barriers.

The course will consist of theoretical lectures, practical sessions with computers and seminars, with an emphasis on fundamental concepts and applications. Attendants are welcome to bring their own data.

### **Instructors**

**MAB-María Alma Bracho Lapiedra** PhD. FISABIO-Public Health Scientist, Genomics and Health Area ([alma.bracho@uv.es](mailto:alma.bracho@uv.es)).

**IC-Iñaki Comas**, PhD. FISABIO-Public Health Scientist, Genomics and Health Area ([inaki.comas@uv.es](mailto:inaki.comas@uv.es)).

Genomics and Health Area ([beatriz.beamud@uv.es](mailto:beatriz.beamud@uv.es)).

**FGC-Fernando González-Candelas**, PhD. FISABIO-Public Health Senior Scientist, Genomics and Health Area and Professor of Genetics, University of Valencia ([fernando.gonzalez@uv.es](mailto:fernando.gonzalez@uv.es)).

**FXL-F. Xavier López-Labrador**, PhD. FISABIO-Public Health Senior Scientist, Genomics and Health Area ([f.xavier.lopez@uv.es](mailto:f.xavier.lopez@uv.es)).

**AC-Álvaro Chiner Oms**, MSc Bioinformatics. Univ. Valencia-FISABIO Public Health Graduate student. Genomics and Health Area ([alvaro.chiner@uv.es](mailto:alvaro.chiner@uv.es)).

**BB-Beatriz Beamud Aranguren**, MSc Bioinformatics. Univ. Valencia-FISABIO Public Health Graduate student.

**NGG-Neris García González**, MSc Bioinformatics. Univ. Valencia-FISABIO Public Health Graduate student. Genomics and Health Area ([neris@uv.es](mailto:neris@uv.es)).

## Module program:

### ***Monday June 25<sup>th</sup>: Introduction and Methodologies***

- 09:00 – 11:00 Welcome and introduction to molecular epidemiology FGC.

Break

- 11:30 - 13:30 Laboratory methods in molecular epidemiology. FXL/BB.

Lunch

- 15:00 - 17:30 Practical session: Introduction to Sequence Analysis. AC/NGG/MAB

### ***Tuesday June 26<sup>th</sup>: Theoretical Foundations***

- 09:00 - 11:00 Methods for estimating population genetic diversity. FGC

Break

- 11:30 - 13:30 Phylogenetic inference from molecular data. MAB.

Lunch

- 15:00 - 17:30 Practical session: Molecular phylogenetic analysis. MAB.

### ***Wednesday June 27<sup>th</sup>: Analysis of Genetic Diversity***

- 09:00 - 11:00 Molecular Epidemiology and Population Genetics of Viruses and Bacteria. FXL/FGC.

Break

- 11:30 - 13:30 NGS introduction and methods. NGG/BB.

Lunch

- 15:00 - 17:30 Practical session: NGS I: Pipelines to evaluate quality, assembling and mapping. IC/AC.

### ***Thursday June 28<sup>th</sup>: Advanced Topics in Molecular Epidemiology***

- 09:00 - 11:00 Molecular Epidemiology and Host Susceptibility. FXL.

Break

- 11:30 - 13:30 NGS case studies in Molecular Epidemiology. FGC/IC.

Lunch

- 15:00 - 17:30 Practical session: NGS II: Comparative analyses of NGS runs. Outbreaks and transmission cases. AC/IC.

### ***Friday June 29<sup>th</sup>: Seminars***

- 09:00 - 11:00 Molecular Epidemiology Seminars – I. FXL.

Break

- 11:30 - 13:30 Molecular Epidemiology Seminars – II. FGC.

Lunch