

HUMAN POPULATION GENOMICS AND GENETIC EPIDEMIOLOGY 2026-2027

PASTEUR COURSE

Human Population Genomics and Genetic Epidemiology



Education Center
Institut Pasteur, Paris



September 21 - October 2, 2026
Application deadline:
June 21, 2026



HUMAN POPULATION GENOMICS AND GENETIC EPIDEMIOLOGY

2026-2027

This two-week presents theoretical lectures, research examples and hands-on computer training on concepts and tools used in population genomics and genetic epidemiology.

First week - topics include

- Principles in genetic epidemiology and statistical genetics
- Public databases in human genomics (1,000 Genomes, ExAC, gnomAD)
- Genetic epidemiology: linkage analyses and association studies
- Genome-wide association studies (GWAS)
- Whole exome and whole genome sequencing
- Computer laboratory work in genetic epidemiology
- Research examples

Second week - topics include:

- Principles in population genetics
- Population structure and human demography
- Methods to detect natural selection
- Genome-wide analyses of natural selection and research examples
- Quantitative genetics and expression quantitative trait loci (eQTL) mapping
- DNA methylation
- Computer laboratory work in population genetics
- Lectures from keynote speakers

Co-directors

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INSTITUT PASTEUR

Education Center

28 rue du Docteur Roux 75015 Paris

Room 5 – September 21 to October 2, 2026

Education Center Room 2/3 – Keynote lectures October 2, 2026

FIRST WEEK

HUMAN POPULATION GENOMICS AND GENETIC EPIDEMIOLOGY

2026-2027

MONDAY, SEPTEMBER 21

HUMAN GENOME DIVERSITY

9:00 – 9:30	Welcome	Administrative Department
9:30 – 10:30	General Introduction	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes) Lluís QUINTANA-MURCI (Institut Pasteur)
10:45 – 12:00	Introduction to Genetic Epidemiology	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes)
12:10 – 12:15	PHOTO	
13:30 – 15:15	Human genome diversity and public databases	Maxime ROTIVAL (Institut Pasteur)
15:30 – 17:00	A survival kit to bioinformatics	Guillaume LAVAL (Institut Pasteur)

TUESDAY, SEPTEMBER 22

GENOTYPE-BASED ANALYSES: LINKAGE ANALYSIS

9:00 – 10:30	Linkage analyses: principles and methods	Sophie GARNIER (Sorbonne Université, Paris)
10:45 – 12:15	Linkage analyses: principles and methods	Sophie GARNIER (Sorbonne Université, Paris)
13:30 – 15:00	Linkage analyses: examples	Sophie GARNIER (Sorbonne Université, Paris)
15:30 – 17:00	Linkage analyses: examples	Sophie GARNIER (Sorbonne Université, Paris)

WEDNESDAY, SEPTEMBER 23

GENOTYPE-BASED ANALYSES: ASSOCIATION STUDIES

9:15 – 10:45	Linkage disequilibrium: principles and methods	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes)
11:00 – 12:30	Linkage disequilibrium: hands-on computer	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes)
13:30 – 15:00	Association studies: principles and methods	Sophie GARNIER (Sorbonne Université, Paris)
15:30 – 17:00	Association studies: examples	Sophie GARNIER (Sorbonne Université, Paris)

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THURSDAY, SEPTEMBER 24

GENOTYPE-BASED ANALYSES: ASSOCIATION STUDIES II

9:00 – 10:30	Genome-wide association studies: principles and methods (Paris Centre de Recherche Cardiovasculaire (PARCC) - INSERM - Université Paris Cité)	Takiy BERRANDOU
10:45 – 12:15	Genome-wide association studies: main steps and procedures (Paris Centre de Recherche Cardiovasculaire (PARCC) - INSERM - Université Paris Cité)	Takiy BERRANDOU
13:30 – 15:00	Genome-wide association studies: hands-on computer I (Paris Centre de Recherche Cardiovasculaire (PARCC) - INSERM - Université Paris Cité)	Takiy BERRANDOU
15:30 – 17:00	Genome-wide association studies: hands-on computer II (Paris Centre de Recherche Cardiovasculaire (PARCC) - INSERM - Université Paris Cité)	Takiy BERRANDOU

FRIDAY, SEPTEMBER 25

SEQUENCE-BASED ANALYSIS: WHOLE EXOME/GENOME STUDIES

9:00 – 10:30	Genetic risk predictions	Hugues ASCHARD (Institut Pasteur)
10:45 – 12:15	Rare variants association studies : principles and methods	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes)
13:30 – 15:00	Rare variants association studies : hands-on computer	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes)
15:30 – 17:00	Paper-Based Revision Session	Aurélie COBAT (Institut IMAGINE, INSERM-Univ. Paris-Descartes)

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SECOND WEEK

MONDAY, SEPTEMBER 28

POPULATION GENETICS, EVOLUTION AND HUMAN DEMOGRAPHY

9:00 – 9:30	Population genetics, evolution and demography: an overview	Lluís QUINTANA-MURCI (Institut Pasteur)
9:45 – 12:15	Principles in population genetics	Paul VERDU (MNHN, Paris)
13:30 – 15:00	Population structure and human demography I	Guillaume LAVAL (Institut Pasteur)
15:30 – 17:00	Population structure and human demography II	Guillaume LAVAL (Institut Pasteur)

TUESDAY, SEPTEMBER 29

NATURAL SELECTION AND GENETIC ADAPTATION

9:00 – 10:00	Research examples of natural selection: why and how	Lluís QUINTANA-MURCI (Institut Pasteur)
10:15 – 12:15	Natural selection: principles and methods	Etienne PATIN (Institut Pasteur)
13:30 – 17:00	Natural selection: hands-on computer	Etienne PATIN (Institut Pasteur)

WEDNESDAY, SEPTEMBER 30

GENOME-WIDE SCANS FOR SELECTION (GSS)

9:00 – 10:30	Basics in genome-wide statistics for selection detection	Guillaume LAVAL (Institut Pasteur)
10:45 – 12:15	Genome-wide scans for selection: principles and hands-on computer I	Etienne PATIN (Institut Pasteur)
13:30 – 15:45	Genome-wide scans for selection: principles and hands-on computer II	Guillaume LAVAL (Institut Pasteur)
16:00 – 17:00	Research example: Genetic ancestry, selection and immune response	Cian REID (Institut Pasteur)

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THURSDAY, OCTOBER 1

THE GENETICS OF GENE EXPRESSION AND BEYOND

9:00 – 10:30	Genetics of gene expression: principles, methods and eQTLs	Maxime ROTIVAL (Institut Pasteur)
10:45 – 12:15	Gene expression and immune response: research examples	Maxime ROTIVAL Marwan SHARAWY (Institut Pasteur)
13:30 – 15:45	Genetics of gene expression: hand-on computer I	Maxime ROTIVAL Yann AQUINO (Institut Pasteur)
16:00 – 17:00	Genetics of gene expression: hand-on computer II	Maxime ROTIVAL Yann AQUINO (Institut Pasteur)

FRIDAY, OCTOBER 2

KEYNOTE LECTURES

Both lectures will take place in room 2/3 of the Education centre

10:00 – 11:00	Genes and immunity: Insights from local ancestry inference leveraging ancient DNA and biobanks	Daniel LAWSON (University of Bristol, UK)
11:00 – 12:00	From GWAS to function: bridging the colocalization gap	Kaur ALASOO (University of Tartu, Tartu, Estonia)
14:00 – 17:00	Written examination (<i>Room 5 of the Teaching Centre</i>) Duration 3 hours - Grade out of 20	
17:00 – 17:15	Evaluation of the course	Administrative department