SEDE BOGOTÁ

DirecciónAcadémica

escuelainternacional2017

GENOMIC EPIDEMIOLOGY AND EVOLUTIONARY CONCEPTS IN INFECTIOUS DISEASES

10TH - 28TH OF JULY, 2017

FACULTAD DE MEDICINA

EDIFICIO 471

INSTITUTIONAL LINKS

Newton-Caldas Fund

EuPathDB

wellcome trust sanger institute

SESQUICENTENARIO

UNIVERSIDAD NACIONAL DE COLOMBIA

GENOMIC EPIDEMIOLOGY AND EVOLUTIONARY CONCEPTS IN INFECTIOUS DISEASES

It is a three-week course directed at graduate and undergraduate students with interest in epidemiology of infectious diseases and its relation to the genetics and evolution of the host and the infectious agents. The aim of the course is to introduce concepts and problems in epidemiology, genetics and evolution of infectious pathogens, in particular protozoan parasites (e.g. Plasmodium) and bacteria. Also to highlight the utility of genomic information and databases for posing relevant biological and epidemiological questions related to the control of infectious diseases.

The first week will be an introduction to general concepts in epidemiology (e.g. basic reproductive number, etc), genetics (genetic diversity, linkage, epistasis, etc) and evolution (phylogenies, assumptions, neutrality, etc). Readings will be provided on each topic.

During the second week in the morning, there will be lectures by invited international scientists. Topics covered fall into three categories: basic science (an introduction to basic topics in molecular biology and genetics), applied sciences (examples of work on infectious agents being performed by invited scientists) and tool talks (experimental tools in pathogen systems). In the afternoon, practical exercises will be carried out on genomic databases and bioinformatic tools. There are three purposes of these exercises:

1) To introduce students to available databases and tools that allow them to ask complex questions about the biology, genetics and evolution of pathogens.
2) To visualize sequences features and genomes.
3) To analyse RNA sequence data.

In the evening, talks about professional development and investigation interests will be carried out. Journal clubs will be presented by students and discussions about the presented papers will be oriented by the expert panel.

During the third week, students will be evaluated to obtain a certificate of assistance and approval of the course. Evaluations will be received via e-mail and qualifications will be send via e-mail, there will not be face-to-face activities in that week.

Twenty-five graduate students (or undergraduate students with interest in epidemiology and genetics of infectious diseases) will be accepted.

Place: Universidad Nacional de Colombia, Bogotá, Colombia.
Dates: July 10-28, 2017.
Number of students: 25.
Language: English/Spanish.

GUEST LECTURERS

Julian Rayner

Biochemist, Lincoln University
Ph. D. Laboratory of Molecular Biology, Medical Research Council
Senior Group Leader, Malaria Programme, Wellcome Trust Sanger Institute
Director of Wellcome Genome Campus Connecting Science, Wellcome Genome Campus, Cambridge CB101SA, United Kingdom

My research seeks to understand the interactions between Plasmodium parasites and human cells, in order to identify and prioritise new drug and vaccine targets. I focus on the stage of the parasite life cycle that infects human red blood cells, as it is this stage that causes all the symptoms and pathology of malaria.
In 2014 I was appointed Director of Wellcome Genome Campus Connecting Science, which enables everyone to explore genomic science and its impact on research, health and society. We connect researchers, health professionals and the wider public, creating opportunities and spaces to explore genomic science and its impact on people. Connecting Science inspires new thinking, sparks conversation and supports learning by drawing on the ground-breaking research taking place on the Wellcome Genome Campus.

Nicholas Thomson

Microbiologist, Warwick University
Postdoctoral fellow, University of Cambridge Biochemistry Department
Group Leader, Bacterial Genomics and Evolution Programme, Wellcome Trust Sanger Institute Wellcome Genome Campus
Professor of Bacterial Genomics and Evolution, London School of Hygiene and Tropical Medicine

Nick is a microbiologist and bioinformatician and is interested in bacterial evolution and spread with a focus on sexually transmitted and diarrhoeal diseases. His lab uses genomic approaches to investigate how variation in bacterial genomes

relates to their hosts/niche, changes over time and geography, or in response to therapeutic interventions. His group also focuses on accessing genome data directly from clinical samples without the need for culture.

Maria Alejandra Diaz

Biologist, Universidad del Valle

PhD student, University of Pennsylvania

Maria Alejandra has been working in understanding how the control of gene expression mediated by small non-coding RNAs is modulating the interaction of the apicomplexan parasite, Toxoplasma gondii and its host.

Manuela Carrasquilla

PhD student at Wellcome Trust Sanger Institute

I studied biology in Bogota, Colombia. I very soon became interested in understanding the biology of parasite-host interactions for which I did a full year of research in malaria both in Germany and the United States prior to joining the PhD programme. My current interest is foccused in using genetics to understand the underlying mechanisms of drug resistance in the human malaria parasite, Plasmodium falciparum. My research aims at developing tools to perform parallel phenotyping in order to understand the fitness cost of strains isolated from various geographical locations showing different sensitivities to antimalarials.

COLOMBIAN LECTURERS

Vladimir Corredor

Biologist, Universidad Nacional de Colombia
M.Sc, New York University
Ph.D. Department of Medical and Molecular Parasitology, New York University
Associate profesor, Public Health Department, Faculty of Medicina, Universidad Nacional de Colombia

My main interest is the evolutionary biology of malaria parasites, with emphasis about the way parasites acquire new mutations that confer drug resistance under particular epidemiological conditions.

Sócrates Herrera

Medical doctor, Universidad de Caldas
Postdoctoral fellow, Centro de Entrenamiento e Investigación en inmunología, University of Geneva
Director at Scientific Investigation Centre – Caucaseco

During his career, Socrates Herrera, has been interested in the causative agent of Malaria. One of his main research interests is to understand the host immune response against the Plasmodium and as a parallel work he has also been trying to develop a possible vaccine against malaria.

Martha Vives

Microbiologist, Universidad de los Andes
M. Sc. In Microbiology, Universidad de los Andes
Ph. D. in sciences – biology, Universidad de los Andes

Pilar Donado

Veterinarian, Universidad Nacional de Colombia
M. Sc. in veterinarian epidemiology, University of Guelph
Ph. D. University of California
Ph. D. Investigator, Corpoica

WORKSHOP

- Databases: EuPathDB
- Artemis
- RNAseq

WORKSHOP SUPPORT

~ Manuela Carrasquilla, Sanger Institute
~ Catalina Peralta, Chemical Engineering student, Universidad Nacional de Colombia
~ Elkin Simanca, Medical student, Universidad Nacional de Colombia

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Universidad Nacional de Colombia
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Wellcome Trust Sanger Institute

COURSE PROGRAM

This is a preliminary schedule of the course sessions, the contents will not vary but the sessions distribution along the course can change, if that happens, the course assistants will be notified on time.

Week 1

	Monday 10	Tuesday 11	Wednesday 13	Thursday 14	Friday 15
09:00 AM - 12:00 M	INTRODUCTION	Concepts Genomics	Concepts Genetics	Concepts Evolution	Concepts Epidemiology

Week 2

	Monday 17	Tuesday 18	Wednesday 19	Thursday 20	Friday 21
8:30-9:30	INTRODUCTION Presentations	Genomic Epidemiology of Enteric Pathogens -Nick Thomson	Large-scale genetics and genomic approaches to identify and prioritise Plasmodium intervention targets-Julian Rayner	Malaria Drug resistance Vladimir Corredor-Julian Rayner	Plasmodium Evolutionary origins - Julian Rayner
9:30-10:30		Infectious disease surveillance across Latin America - Pilar Donado	Malaria genomic epidemiology in Colombia Vladimir Corredor	Socrates Herrera	Genomic evolution of phage-bacteria interaction - Martha Vives
10:30-11:00	COFEE BREAK	COFEE BREAK	COFEE BREAK	COFEE BREAK	COFEE BREAK
11:00-12:00	Bacterial Genomics and Antimicrobial Resistance - Nick Thomson Genomic Epidemiology of enteric bacteria - Nick Thomson	Acquiring Epidemiological Data from Genomic Information - Nick Thomson	CRISPR/Cas9 genome editing - Manuela Carrasquila	RNAseq - Alejandra Díaz	
12:00-1:30	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1:30-4:00	Bacterial Genomics	DATABASES (EUPATH)-Alejandra Diaz	DATABASES (EUPATH)-Alejandra Diaz	ARTEMIS-Manuela Carrasquilla	RNAseq - Alejandra Díaz
4:00-4:30	COFEE BREAK	COFEE BREAK	COFEE BREAK	COFEE BREAK	COFEE BREAK
4:30-5:30	Bacterial Genomics	DATABASES (EUPATH)-Alejandra Diaz	How to write a CV, How to design a conference poster-Julian Rayner	How to write a travel grant-Julian Rayner	Share CV and cover letters for feedback-Julian Rayner
5:30-6:30	Journal Club Explanation Vladimir Corredor	Journal Club Self-led	Journal Club Self-led	Journal Club Self-led	Journal Club Student Presentations

Week 3 – Evaluations