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## Genome Wide Association Studies

Vincent Segura

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## Summer School

### Next-generation sequencing for beginners: applications to population genetics, forest health and tree breeding

**Dates:** June 17-19<sup>th</sup>.

**Venue:** University Residence “Reyes Católicos”, in Valladolid (<http://en.wikipedia.org/wiki/Valladolid>).

**Description:** This course is intended to give a brief introduction to new sequencing technologies (the so-called Next-Generation Sequencing or NGS) and their applications in forest research. The *first part of the course* will provide a general overview on the steps followed by a typical NGS project, covering the following topics:

FASTQ format and sequence quality (Phred score and fastqc software)

A simple pipeline: BWA + Samtools

Visualization: IGV

Identifying SNPs: Samtools

Annotating SNPs: ensembl vep.pl

Identifying structural variants

RNAseq: tophat + cufflinks

De novo assembly: SGA

The *second part of the course* will be focused on applications of NGS to taxonomy, population genetics and breeding, including talks on adaptation to environmental changes, genomic selection and analysis of environmental samples. A hands-on workshop on genome-wide genetic association (GWAS) will take place on the afternoon of the second day. Finally, a second workshop on forest health (pathology) and application of molecular tools to plant disease diagnosis will be developed on the last day of the course.

**Accommodation:** Students are recommended to take a room University Residence “Reyes Católicos” (34.38 € per night for a single room and 47.31 € per night for a double room, breakfast included).

**Organizers:** Sustainable Forest Management Research Institute, formed by Forest Research Centre, INIA and University of Valladolid.

#### Teachers:

Miguel Pérez-Enciso, Universitat Autònoma de Barcelona (Bioinformatics).

Juan José Robledo-Arnuncio, Forest Research Centre, INIA (Population Genetics).

Santiago C. González-Martínez, Forest Research Centre, INIA (Genomic Selection).

Marta Goberna, CEBAS-CSIC, Murcia (Environmental Samples).

Vincent Segura, UR 588 AGPF, INRA Orléans (GWAS).

Speakers for the forest pathology workshop to be confirmed.

**Pre-registration:** Please, write an email to Elena Hidalgo ([ehidalgo@pvs.uva.es](mailto:ehidalgo@pvs.uva.es)) and/or Santiago C. González-Martínez ([santiago.c.gonzalez.martinez@gmail.com](mailto:santiago.c.gonzalez.martinez@gmail.com)), indicating your name, organization and (briefly) the reasons why you would like to attend the course.