



# UPM International Summer School

## Plant Biotechnology and Genomics

CBGP

3, 4 & 5 July 2019

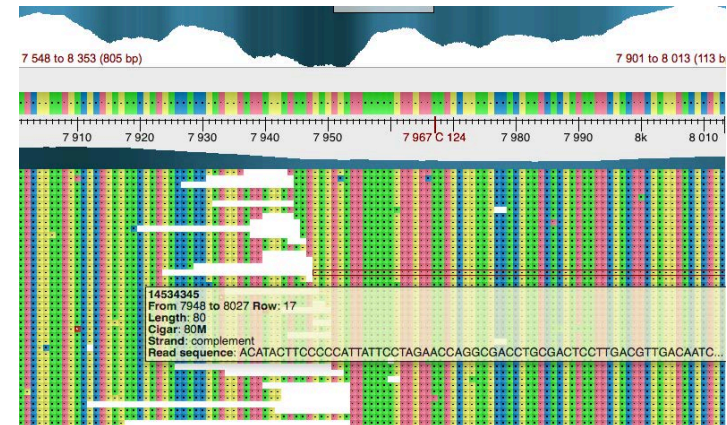
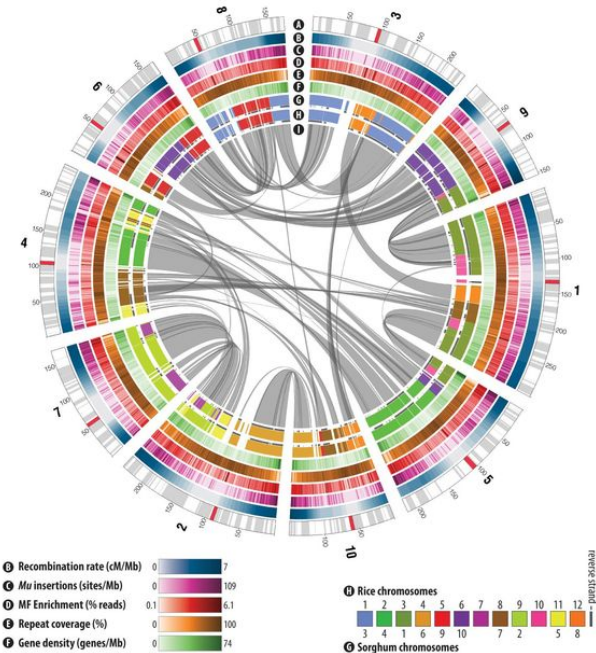
Instructors: Antonio Molina, Jaime Huerta-Cepas (CBGP (UPM-INIA))

**Summary:** A key social challenge is to breed crops with improved traits contributing to get a sustainable agriculture (**better plants with less demands**). Many of these improvements will be based on our ability to understand the DNA (genomics) of many plants and their associated microorganisms and to apply this knowledge, by means of biotechnology tools, to food production.

**Students:** Preferentially students of science and technology-related bachelor and master programs.

**Pre-requisites:** Basic knowledge of biology (genes and gene function) is welcome

**ECTS:** 1 (10 in-class hours)





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### Syllabus

**MODULE 1: I. Introduction to Genomics.** Understanding the link between DNA (genomes) and biological function. Description of genome sequencing techniques and the bioinformatics analysis used to characterize gene function and their role on biological processes in plants and associated microorganisms.

**II. Genomics Lab Practice: Could you assemble a genome?**

Learn how to obtain the complete genome of an organism and compare it to other species.

**MODULE 2: I. From Genomics to Biotechnology**

Description of the biotechnological tools that can be used to develop crops with improved traits which contribute to sustainable agriculture. Social perception and future challenges of Green Biotech.

**II. Visit to CBGP (UPM-INIA) facilities**

Understanding the infraestructura required for research and innovation in Plant Biotechnology and Genomics.

**MODULE 3: Sustainable Agriculture Challenges: Contribution and opportunities for Biotechnologies and Genomics**

Open discussion with professionals of the AgBlo Tech sector.



Figure 9-5 Plant Biology (© Garland Science 2010)



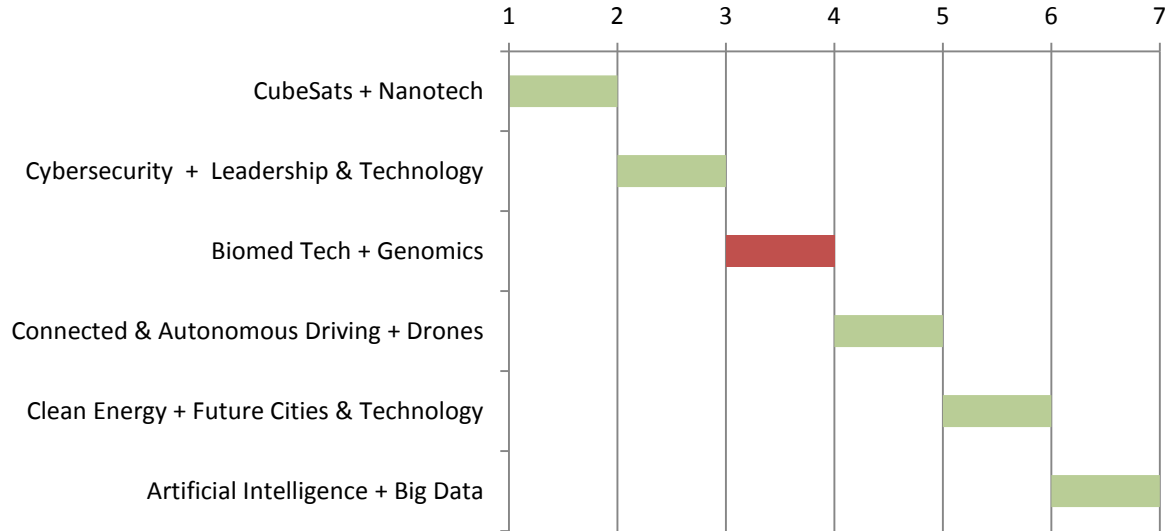
Figure 8-17a Plant Biology (© Garland Science 2010)



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### Schedule



Week	Monday	Tuesday	Wednesday	Thursday	Friday
3			Lecture Practical Exercise	Lecture Visit	Industry Talk



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## Plant Biotechnology and Genomics

### Professor Antonio Molina

Director of the Centro de Biotecnología y Genómica de Plantas (CBGP, UPM-INIA). Professor of Biochemistry and Molecular Biology at the Biotechnology and Plant Biology Department (UPM). Group leader of the Plant Innate Immunity Group at CBGP. Co-founder of the UPM Spin-off company PlantResponse Biotech SL. Dr. Molina has published 70 scientific articles with more than 11,500 citations. He is co-inventor of 5 Patents/Know-hows under commercial exploitation

### Dr. Jaime Huerta-Cepas

INIA Researcher. Group Leader of the Comparative Genomics and Metagenomics group at CBGP (UPM-INIA) and former researcher at the Centre for Genomics Regulation (CRG, Barcelona) and the European Molecular Biology Laboratory (EMBL, Germany). His group focuses on the identification of novel gene functions out of metagenomics data, the interaction between microbiome and environment, and the evolutionary implications of functional divergence. To do this, they use comparative genomics approaches, genome-wide sequencing data, and high performance computing.

<http://compgenomics.org>

### Francisco Javier García Domínguez

EMEA Director of PlantResponse Biotech SL, a UPM spin-off company. He worked previously in the Dow Agrosience agriculture company. Francisco Javier García Domínguez holds a Master in Plant Biotechnology from the UPM.



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