

UNIVERSITÀ DEGLI STUDI  
DEL SANNIO Benevento

DST

DIPARTIMENTO DI SCIENZE E TECNOLOGIE

Dottorato di Ricerca in Scienze e Tecnologie per l'Ambiente e la Salute

**GIORNATE SCIENTIFICHE DEL DST**



**Prof. María-Dolores Rey**

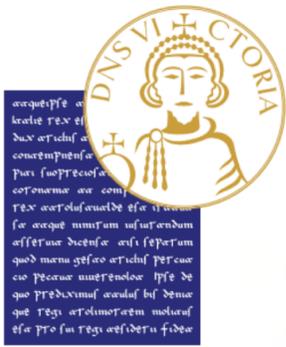
Department of Biochemistry and Molecular Biology  
University of Córdoba (Spain)

**From Genomics to Application:  
Biotechnological Tools to Enhance Resilience and  
Valorization of Mediterranean *Quercus***

**MERCOLEDÌ 11 MARZO 2026 ORE 10.00  
Aula 12C - CUBO, Via dei Mulini, Benevento**

**ABSTRACT**

Mediterranean *Quercus* species are essential for ecosystem sustainability and rural economies but are increasingly threatened by the decline syndrome and climate change. This lecture will show how advanced molecular tools, including genomics, epigenomics, transcriptomics, and metabolomics, are being integrated to uncover the biological basis of resilience to abiotic and biotic stresses. Emphasis will be placed on the identification of molecular markers for the early selection of tolerant genotypes, the analysis of functional diversity, and the characterization of key metabolic pathways. The potential applications of these advances in forest restoration, breeding programs, sustainable management of oak ecosystems, and the biotechnological and nutraceutical exploitation of *Quercus* bioactive compounds will be discussed.



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**Prof. Antonio Rafael  
Sánchez-Rodríguez**

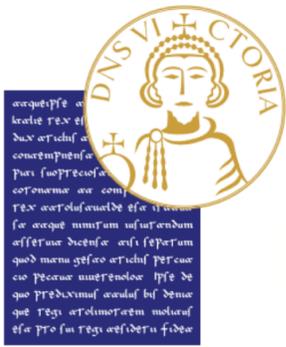
Department of Agronomy  
University of Córdoba (Spain)

**Agricultural soil health in Mediterranean regions:  
innovative solutions for resilient farming systems  
focus on soil fertility and management**

**GIOVEDÌ 12 MARZO 2026 ORE 16.00**  
Aula 12C - CUBO, Via dei Mulini, Benevento

ABSTRACT

Soil health underpins agricultural productivity while acting as a key indicator of sustainability and resilience under climate change. In this lecture, I will present an integrated overview of my research, focused on how soil processes regulate nutrient availability, microbial functioning, and crop performance and quality in real-world agricultural systems. I will begin by outlining the major challenges faced by Mediterranean and semi-arid soils (low organic matter content, phosphorus (P) limitations in calcareous soils, water scarcity, and degradation driven by intensive management) and introduce a functional soil health framework based on nutrient cycling, biodiversity, and the regulation of trace gas fluxes. I will then synthesize evidence from my work on soil organic carbon and nutrient dynamics. A central part of the lecture will address sustainable nutrient management, with a particular focus on P. I will explore innovation pathways for improving soil health and agroecosystem resilience, including conservation agriculture, bio-based fertilizers and biostimulants, crop diversification, and emerging methodological approaches such as rhizosphere microdialysis, and studies on abiotic nitrogen fixation driven by soil mineralogy and photochemical processes. I will discuss P-Zn and P-Fe interactions, nutrient use efficiency, and biofortification strategies, as well as the performance of alternative P sources such as struvite and composted organic amendments across soils with contrasting physicochemical properties. Mechanistic insights into microbial and biochemical controls, especially the role of soil enzymes (phosphatases and  $\beta$ -glucosidase), will be emphasized to explain soil-specific responses.



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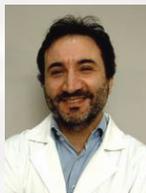
## WORKSHOP

### Artificial Intelligence in Scientific Research: from principles to applications.

VENERDÌ 13 MARZO 2026 ORE 14 - 18

Sala riunioni del DST - Via F. de Sanctis - Benevento

#### How AI works: ideas and principles



Prof. Francesco Napolitano  
Dipartimento di Scienze e Tecnologie  
Università degli Studi del Sannio

#### Large Language Models in Academic Research: Opportunities, Limitations, and Best Practices

Dott. Domenico Felice  
Dipartimento di Scienze e Tecnologie  
Università degli Studi del Sannio



#### Artificial Intelligence to Understand Plants: From Theory to Practice



Dott.ssa ILVA LICAJ  
Dipartimento di Scienze e Tecnologie  
Università degli Studi del Sannio