Summary of the research conducted within your group

Our research group investigates the molecular interactions between *Trichoderma* and plants, both as a biocontrol agent and biostimulant in crops of agricultural interest, aiming to reveal how *Trichoderma* enhances plant tolerance to abiotic stress and pathogen resistance via priming. Current projects explore the role of *Trichoderma*-derived miRNAs as cytoplasmic effectors that induce systemic resistance against major pathogens affecting crops like tomato and wheat, and their use as "plant vaccines"; the molecular mechanisms involved in transcriptomic and physiological responses of crop plants to water stress induced by *Trichoderma*; and comparative pangenomic studies related to nitrogen and ethylene metabolism in the *Trichoderma* genus.

Research trajectory (Javier Sánchez-Martín)

My research centers on how crops, especially cereals, defend themselves against both environmental and pathogenic stresses. Over the years, I have transitioned from field-based studies on disease and drought resistance to cutting-edge molecular work on immune receptor genes in cereal-pathogen interactions. My current focus—combining genomics, transcriptomics, and translational research—lies in understanding how *Trichoderma*, a beneficial fungus, primes plant immune responses to enhance resistance against biotrophic pathogens. This includes exploring the role of *Trichoderma*-induced microRNAs as potential "plant vaccines" and dissecting the molecular dialogue between crops and microbes, with the ultimate goal of developing innovative strategies for climate-resilient agriculture.