My work focuses on the regulation of leaf gas exchange under water stress conditions in semiarid regions, especially in crop woody species. The final goal of my research is to provide to farmers and managers with effective, friendly and robust tools, which can assess them when taking decisions on irrigation or management of the crop, like prunning and fertirrigation. In order to achieve so, two research lines have been set in my research group: 1) use of plant-based sensors to characterize the level of water stress of the crop; 2) the study of the physiological mechanisms of plant response to water stress and the integration of all that knowledge in mechanistic models. Both lines of research complement each other nicely, and we propose that currently it is compulsory a combination of process-based models and plant-based sensors to correctly manage water stress in deficit irrigation strategies. I think that what makes me different in the scientific community is that despite having as the main goal the optimisation of water in agriculture, which is a very applied goal, I have approached it from a very physiological perspective. I have tried to escape away from any empiricism in the use and interpretation of plant-based sensors, and the import this physiological knowledge into agronomy has produced a very satisfactory outcome. In addition to any scientific production in form of papers in journals, one of the consequences of my approach has been the successful interaction with companies and farmers to implement these models with the purpose of make a rational use of resources and taking the right decisions.