Speaker: Andrea Mair, Stanford University
Talk Title: Proximity labeling as an emerging strategy for identification of local proteomes and protein complexes in plants

Abstract: Cellular processes rely on the intimate interplay of different molecules, including DNA, RNA, proteins and metabolites. Obtaining and integrating data on their abundance and dynamics at high temporal and spatial resolution is essential for our understanding of plant growth and development. In the past decade, enzymatic proximity labeling (PL) has emerged as a powerful tool to study local protein and nucleotide ensembles, discover protein-protein and -nucleotide interactions and resolve questions about protein localization and membrane topology. Target proteins, which are in close proximity to the PL enzyme, are labeled in living cells and subsequently affinity purified without the need to keep protein complexes or organelles intact, thereby overcoming challenges of more traditional methods. This allows for purification of targets with poor solubility, like membrane protein, and probing of local proteomes in hard-to-purify or membrane-less organelles or in specific subdomains of the cell and facilitates identification of targets in rare cell types or developmental stages. Improvement of enzymes and methods has recently made PL accessible to plants and continues to broadened the spectrum of possible applications. In this talk, I will give a general overview over the main PL techniques amenable to plants, potential applications and challenges and show examples of how we have used PL to identify putative transcription factor complexes and local proteomes at opposing sides of the plasma membrane in rare cell types of the stomatal lineage.