



## ***ABSTRACT***

"Plant cell membrane protein dynamics"

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Cell membrane proteins play a key role in the ability of plants to sense and respond to their environments. We have been utilizing live-cell imaging techniques to study protein interactions within and across the plasma membrane. A clue to the way in which membrane proteins associate with each other is in the way in which they diffuse within the plasma membrane. Using photoactivation and photobleaching of fluorescent proteins, we have been able to determine that different types of proteins have differing mobility and we are now working to determine how protein conformation and insertion into membranes govern mobility characteristics. I will illustrate the technique that we have developed by describing three recent case studies. Plants regulate plasma membrane viscosity by altering their fatty acid composition in response to temperature fluctuations. We have determined, however, by examining diffusion of the membrane marker LTI6b-GFP that these alterations maintain homeostasis of membrane viscosity. Secondly, the plasma membrane protein formin1 is an actin cytoskeleton regulatory protein that remains relatively immobile and we have determined that it is anchored through association with the cell wall. This is the first report of a protein bridging between the cytoskeleton and the cell wall. Finally, a new study with colleagues at VIB, Gent has revealed that lateral mobility of PIN proteins and ultimately their asymmetrical distribution in polarized cells is controlled by interactions with the extracellular matrix.

These findings should be of general interest to physiologists, cell biologists and developmental biologists alike. Understanding the mechanisms of protein associations at the cell membrane will be key to new discoveries in these fields.