Plant roots use gravity to correctly navigate in the darkness of the soil. Gravity direction is perceived in columella cells, which trigger asymmetric transport of auxin towards the epidermis. In response to auxin, epidermal cells adjust their growth rate which results in bending of the root.

There is a gap in our understanding of how gravity is perceived, how the asymmetry in auxin transport is achieved and how the growth response is executed. In order to reveal how auxin regulates root growth, we want to uncover the dynamics of cellular physiology of root cell elongation using specialized live-cell imaging approaches, and we aim at identifying the signaling network that connects the TIR1/AFB-Aux/IAA coreceptor with the rapid physiological events occurring at the plasma membrane – cell wall interface.