# Membrane scaffolding at the tight junction: super-resolution and reconstitution

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My lab is focused on revealing the structure, dynamics and functions of cell membranes in the context of tissue formation. To this end we study the ultra-structure of the membrane-cortex interface in 3D cell culture systems (organoids) using super-resolution STED-microscopy. We compliment this approach with in vitro reconstitution to understand how membrane domains self-organize. In this presentation I will show our latest results on the structure and dynamics of the tight junction (TJ) in epithelial tissue. Super-resolution and reconstitution experiments of the main TJ scaffolding proteins (ZO) indicate that these proteins drive junction formation by condensation into phase separated membrane attached domains. The ZO condensed phase sequesters interaction partners such as adhesion receptors, cytoskeletal adapters and actin. Our results suggest that tight junction assembly is driven by a transition of ZO proteins into a condensed phase which nucleates adhesion receptor (claudin) and actin polymerization and sequesters signaling molecules and transcription factors to the junction.