Primary cilia are microtubule-based sensory organelles present in the majority of mammalian cells, including cerebral cortical neurons (Liu et al., 2021). My research evaluates potential influence of neuronal primary cilia in patterned neural circuits by focusing on a new class of fusiform projection neurons identified in layer 5 and 6 of human cerebral cortex. We want to examine if primary cilium position and orientation correlates with dendrite orientation, if connected fusiform neurons with opposing basal dendrite orientation preferentially share a common set of ciliary connections, or if radial patches of similarly oriented fusiform neurons share common ciliary connection patterns. We have currently detected: (1) Radial organization of distinct groups of fusiform neurons, (2) cilia in connected pairs of fusiform neurons, and (3) cilia of connected fusiform neurons have common cellular links.