Research Statement, Morgan Sammons

The goal of the Sammons Laboratory is to advance a mechanistic understanding of p53 activity within variable genetic and epigenetic contexts. TP53 is the most frequently mutated gene in human cancer and genetic evidence across biological taxa implicates TP53 as a master tumor suppressor gene. The p53 protein is a DNA-binding transcription factor that responds to diverse intrinsic and extrinsic cellular stress signals by activating an anti-oncogenic gene expression program. Despite the critical nature of the p53 protein in tumor suppression, the mechanisms by which p53 elicits these cell-protective gene expression cascades are not well understood.

The lab is currently interested in two fundamental questions pertaining to the activity of p53 family member proteins. First, we are investigating how wild-type p53 exerts tumor suppressor activity in the context of genomic and epigenomic variability. Simply put, we want to better understand how p53 interacts with and functions on chromatin, the physiological template of DNA. Second, we are interested in elucidating the mechanisms underlying p53-dependent and cell lineage-specific tumor suppression. That is, why and how does p53 behave differently across different cells, tissues and organisms. Finally, the lab is fascinated with how the p53 family members p63 and p73 elicit radically different cellular responses, despite interacting with the same DNA sequences.

Our work on p53 spans multiple experimental paradigms, from traditional molecular and biochemical techniques to cutting-edge genetic and genomic technologies. We are currently recruiting excited and motivated undergraduate, graduate, and post-doctoral trainees to join the laboratory.