Abstract: The moduli space of n-marked, genus g tropical curves is a cell complex that was identified in work of Abramovich-Caporaso-Payne with the boundary complex of the complex moduli space $M_{g,n}$. It also has connections to many other important geometric objects: for example, if $g = 0$, it is the Billera-Holmes-Vogtmann space of phylogenetic trees, while if $n = 0$, it is a compactified quotient of Culler-Vogtmann Outer space. In this talk, I will give new results on the topology of tropical $M_{1,n}$ and $M_{2,n}$, obtaining as corollaries new calculations of the top-weight cohomology of the complex moduli spaces $M_{1,n}$ and $M_{2,n}$. Joint work, in part, with Galatius and Payne.