In this talk I will report on joint work with Renzo Cavalieri. Natural tautological classes $P_g(\alpha; \beta)$ on $\mathcal{M}_{g,n}^{rt}$ are studied. They arise by pushing forward the virtual fundamental classes of spaces of relative stable maps to an unparameterized $\mathbb{P}^1$ with prescribed ramification over 0 and $\infty$ given by partitions $\alpha \vdash d$ and $\beta \vdash d$ respectively. A theorem of Vakil shows the $P_g(\alpha; \beta)$ to be polynomial in the parts of the partitions. This polynomial is computed explicitly in low genus and low total length $l(\alpha) + l(\beta)$. I will discuss these computations and our approach to a general algorithm for computing these classes. (Received September 20, 2010)