1145-11-1207 **Steven J Miller***, Department of Mathematics and Statistics, Williamstown, MA 01267. *Rank and Bias in Families of Curves via Nagao's Conjecture.* Preliminary report.

Let $\mathcal{X} : y^2 = x^{2g+1} + A_{2g}(T)x^{2g} + \cdots + A_0(T)$ be a nontrivial one-parameter family of hyperelliptic curves of genus g over $\mathbb{Q}(T)$ with $A_i(T) \in \mathbb{Z}[T]$. Denote by $\mathcal{X}_t$ the specialization of $\mathcal{X}$ to an integer t, $a_t(p)$ its trace of Frobenius, and $A_{r,\mathcal{X}}(p) = \sum_{t(p)} a_t(p)^r$ its r-th moment. The first moment is related to the rank of the Jacobian by the generalized Nagao conjecture. Generalizing a result of Arms, Lozano-Robledo, and Miller, we compute first moments for various families resulting in infinitely many hyperelliptic curves over $\mathbb{Q}(T)$ with Jacobian of moderately large rank; by the specialization theorem, this yields hyperelliptic curves over $\mathbb{Q}$ with large rank Jacobian. When $\mathcal{X}$ is an elliptic curve, Michel proved $A_{2,\mathcal{X}} = p^2 + O\left(p^{3/2}\right)$. For the families studied, we observe the same second moment expansion. Furthermore, we observe the largest lower order term that does not average to zero is on average negative, a bias first noted by Miller in the elliptic curve case. We prove this bias for a number of families. This is joint work with Scott Arms, Trajan Hammonds, Seoyoung Kim, Ben Logsdon, and Alvaro Lozano-Robledo. (Received September 20, 2018)