Dawn C. Nelson* (dnelson1@saintpeters.edu). Permutation polynomial research with beginning undergraduates. Preliminary report.

Lidl and Mullen challenged: “Consider the binomial $f(x) = x^k + ax^j$ with $k > j \geq 1$, $\gcd(k,j) = 1$, and $a \in F_q^*$. Determine conditions on $k$, $j$ and $q$ so that $f(x)$ permutes $F_q$.” By considering the question for $F_p$ (with $p$ prime), this challenge can be tackled by beginning undergraduate students.

In this talk, I describe how a student (whose highest level math class was AP Calculus) used Mathematica to study permutation binomials. The student was able to enumerate a comprehensive list of conditions on $k$, $j$ and $p$. I explain her results and conjectures. The talk finishes with a list of several level-appropriate open questions. (Received September 24, 2017)