1086-37-2460 **Michelle Manes*** (mmanes@math.hawaii.edu), Department of Mathematics, 2565 McCarthy Mall, Keller 401A, Honolulu, HI 96822, and **Bianca Thompson**. *Periodic Points in Towers of Finite Fields.* Preliminary report.

When iterating a polynomial function $\phi$ over a finite field, the orbit of any point $\alpha \in \mathbb{F}_{p^n}$ is a finite set; i.e. all points are pre-periodic. But many natural questions about the structure of orbits over finite fields remain:

1. Fix a finite field $\mathbb{F}_{p^n}$ and look over all polynomials of fixed degree $d$: On average are there "lots" of perioidic points with relatively small tails leading into the cycles? Or do we expect few periodic points with long tails?

2. Fix a polynomial: How does the proportion of periodic points in $\mathbb{F}_p$ vary as $p \to \infty$?

3. Again fix a polynomial: How does the proportion of periodic points in $\mathbb{F}_{p^n}$ vary as $n \to \infty$?

Recent work by Flynn and Garton addresses the first question. In her thesis, Madhu tackles the second question in the case $\phi(z) = z^m + c$.

We focus on the third question in the special case that the polynomial map $\phi(z)$ can be viewed as an endomorphism of an underlying algebraic group. The work is ongoing, and we hope to extend results if possible to more general polynomial maps. (Received September 25, 2012)