MATT OLECHNOWICZ, University of Toronto
Dynamically improper hypersurfaces for endomorphisms of projective space

Most nonlinear endomorphisms of $\mathbb{P}^n$ have no nontrivial preperiodic subvarieties (that is, aside from preperiodic points and the whole space), which presents an obstacle to generalizing certain phenomena from $\mathbb{P}^1$. For instance, the statement that post-critically finite (PCF) maps are Zariski dense in the parameter space End_d^n (of degree-d endomorphisms of $\mathbb{P}^n$) is true when $n = 1$ but false when $n > 1$.

Motivated by these observations, we are led to consider an alternative generalization of the notion of preperiodicity, from points in $\mathbb{P}^1$ to hypersurfaces in $\mathbb{P}^n$, which we call dynamical improperness. In this talk, we will define what it means for a hypersurface to be dynamically improper and explain the connection to preperiodicity. We will show that every nonlinear endomorphism of $\mathbb{P}^n$ has infinitely many dynamically improper hypersurfaces. We will also show that maps with dynamically improper critical loci (which coincide with PCF maps when $n = 1$) are Zariski dense in the parameter space End_d^n for all $n > 1$ and $d > 2$.