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M Banuelos* (mbanuelos4@ucmerced.edu) and **S S Sindi**. *Modeling Transposable Element Dynamics with Fragmentation Equations.*

Transposable elements (TEs), segments of DNA capable of self-replication, are abundant in the genomes of most organisms. Because they are generally unnecessary, the host genome consists of both full-length (actively replicating) and partial length (inactive remnant) copies of TEs. Advances in sequencing efforts have led to TE annotations of many species and has revealed numerous partial length TEs remaining in host genomes.

We derive a novel mathematical formulation of TE dynamics that models the density of full and partial length copies with fragmentation equations and thus leverages the full TE annotation of a genome. We derive both an explicit form of the time-varying TE density and steady-state distribution. We fit our model distributions to present-day annotated collections of TEs from the genomes of species of fruit-flies and birds and uncover quantitative relationships of TE dynamics. More specifically, we determine species-specific transposition relationships within specific families of TEs and use cluster analysis of these rate estimates to assess the evolutionary history of these species. As a result, our work provides support for several hypotheses in the literature for the role of horizontal transfer of TEs between species. (Received September 26, 2017)