Genetics Day Poster Submission

Presenter: McKayla Ford

Category: Graduate Student

Authors: MCKAYLA FORD, Ching-Hua Shih, Paula Vertino

Title: THE INFLUENCE OF DNA STRUCTURE ON POLYMERASE PAUSING

Abstract: Promoter-proximal pausing is an early rate-limiting step of transcription, wherein RNA Pol II halts shortly after initiation and is restricted from entering productive elongation until released from this pause. Many promoters contain CpG islands (CGIs): regions with high CpG content, high GC percentage, and distinct chromatin signatures. Previous work in our lab identified a novel second pause site, at the 3' edge of promoter-associated CGIs, which we named the distal pause. This pause site is enriched in GC skew: an excess of Gs over Cs on the coding strand. Transcription over GC skew results in the formation of RNA-DNA hybrid structures (R-loops), which can cause DNA damage if left unresolved. We hypothesize that distal pausing plays a role in the formation of CGI R-loops, and that the resolution of such structures is necessary for the release of the distal pause and proper gene function.