Unlike most vertebrates, sea lamprey embryos undergo unique changes that re-engineer the physical structure of their genome. These restructuring events (known as programmed genome rearrangements) result in the selective removal of several hundred genes from essentially all somatic cell lineages: they are only retained by the germline. Previous studies have found that this loss of DNA is highly orchestrated and presumably involves changes in the movement of eliminated DNA during anaphase. However, our understanding of the processes of DNA elimination has been reconstructed from snapshots of fixed embryos and the process has never been observed in living embryos. My work seeks to optimize DNA staining, imaging and embryo culture methods that permit the real time visualization of DNA elimination in live, unfixed embryos.