P042 Molecular evolution of X-chromosome drive in *Drosophila recens*

Kelly A. Dyer[1], Brian Charlesworth[1] and John Jaenike[2]
[1]*Institute of Evolutionary Biology, University of Edinburgh, UK*
[2]*Department of Biology, University of Rochester, USA*

Mendelian segregation ensures that alleles compete on a level playing field, thus maximizing the efficiency of natural selection. Via meiotic drive alleles can short-circuit this process and achieve enhanced transmission, but because there is strong selection on the rest of the genome to counteract drive, a drive system may eventually consist of a complex array of unlinked suppressors and drive-linked enhancers. We have been studying the effects of this intra-genomic conflict on long and short-term patterns of molecular evolution in the fly *Drosophila recens*, which is polymorphic for a driving X chromosome (X^D). While standard (X^{ST}) chromosomes exhibit high levels of polymorphism at multiple unlinked loci, all of the X^D chromosomes carry an essentially identical multi-locus haplotype. Recombination is completely suppressed between X^{ST} and X^D in heterozygous females, as would be required to maintain the association of loci that interact epistatically for the expression of drive. The long-term costs of foregoing recombination may be substantial, and in combination with its low effective population size, make the X^D chromosome susceptible to the accumulation of deleterious mutations. In line with this prediction, X^D chromosomes are fixed for an X-linked recessive mutation that causes complete female sterility.