"The Evolutionary Enigma of Sex," presented by Professor Sarah (Sally) Otto of the University of British Columbia for the Morrison Institute Winter Colloquium

Professor Otto’s work focuses on the development of population-genetic models, using analytical and numerical techniques to infer what evolutionary changes are possible and under what conditions. The goals of this research are to produce specific predictions that can be tested either experimentally or by comparing the expected and observed distributions of a trait.

In this presentation, Professor Otto examines one of the greatest puzzles in evolutionary biology, which is the high frequency of sexual reproduction and recombination. Given that individuals surviving to reproductive age have genomes that function in the current environment, why should they risk shuffling their genes with those of another individual? Mathematical models are especially important in developing predictions about when sex and recombination can evolve, because it is difficult to intuit the outcome of evolution with several interacting genes. Interestingly, early theoretical analyses found it difficult to identify conditions favouring the evolution of high rates of sex. One reason why an answer to the paradox of sex has been so elusive is that our models have focused unduly on populations that are infinite in size, unstructured, and isolated from other species. Yet most verbal theories for sex and recombination consider a finite number of genotypes evolving in a biologically and/or physically complex world. Professor Otto will review the various hypotheses for why sex and recombination is so prevalent and discuss theoretical results indicating which of these hypotheses is most promising.

Sarah Otto earned her B.Sc. and Ph.D. at Stanford. She was a Miller Post-doctoral Fellow, UC Berkeley (1992-94); and SERC Post-doctoral Fellow, University of Edinburgh (1994-95). She won the Young Investigator Prize from the American Society of Naturalists in 1995. She was the Distinguished Professor or the Peter Wall Institute, at the University of British Columbia in 1999, a Steacie Fellow, NSERC (2001-2003), and won the McDowell Prize at UBC in 2004.