

# **Evolutionary Genomics and Genome Biology at IJS**

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Evolutionary genomics is a powerful field of research, because it unites the disciplines of molecular and evolutionary biology. By applying statistical methods to the genome, one can investigate the history of individual genes and identify loci recently under natural selection. This allows one to probe the landscape of evolution at an unprecedented level of efficiency and precision. The comparative analysis of genome sequence data is transforming evolutionary biology. Not only does genomic analysis allow us to reconstruct phylogenetic patterns and processes with more accuracy than ever before, but it also provides new insights to the fundamental mechanisms of evolutionary change. Comparative genomics enables us to identify the parts of genomes that have changed during recent evolution, which gives us an indication of the evolutionary processes that are currently moulding the genome. Evolutionary processes that contribute to the phenotypes observed besides natural selection include exaptation, genetic drift and demographic events, such as population bottlenecks.

Our research covers a wide array of questions in molecular and genome evolution. We use diverse approaches to address fundamental question in evolutionary genomics, and genome biology, such as gene duplication, genetic redundancy, retroelement evolution, and adaptation. The availability of many sequenced genomes together with the availability of thousands of additional genomes in the near future is opening up entirely new avenues for the study of gene function and gene evolution, potentially revealing the origins of molecular and functional diversity.

An overview of the research topics that are investigated at IJS in the fields of Evolutionary Genomics and Genome Biology will be presented. I will present our objects of desire and diverse approaches that are used in our research.