DOCTORAL CANDIDATE:

DEGREE:	Philosophiae Doctor
FACULTY:	Faculty of Mathematics and Natural Sciences
DEPARTMENT:	Department of Biosciences
AREA OF EXPERTISE:	Evolutionary Genomics
SUPERVISORS:	Glenn-Peter Sætre & Kjetill Jakobsen
DATE OF DISPUTATION:	28th of September 2018

DISSERTATION TITLE: *The Genomics of Hybrid Speciation*

The genomic landscape of a hybrid species is marked by alternating regions of parental inheritance and areas of genomic constraint which form reproductive barriers.

A PhD candidate at the University of Oslo has explored how hybridization can shape genomes and lead to the origin of new hybrid species. By examining the genomes of a sparrow study system, Cassandra Trier has shed light on this form of speciation by investigating the genomic architecture of a hybrid bird species, the Italian sparrow (*Passer italiae*) in relation to its parents, the house (*Passer domesticus*) and Spanish (*Passer hispaniolensis*) sparrows. Her work demonstrates that there is evidence for reproductive isolation between the Italian sparrow and its parents and that the genome of this hybrid species has a mosaic pattern of parental inheritance. A key feature of the Italian sparrow genome is signatures of balancing selection which preserves variation in genomic regions where diversity is advantageous. In particular, genes involved in the immune system where diversity increases fitness were over-represented in areas of the hybrid genome that differs from both its parents.

Her research also shows that there is variability between hybrid populations on separate islands, particularly in genes related to plumage coloration and beak morphology. This shows that the new genetic combination in the hybrid genome may facilitate local adaptation in different environments. Yet, some areas of the of the Italian sparrow are constrained to inheritance from one parent and play a role in isolating the hybrid from the other parent. These regions of genomic constraint are over-represented on sex chromosomes and nuclear genes with mitochondrial function, pointing to an integral role of these genome regions in the formation of reproductive barriers.

Overall, this PhD research demonstrates how hybridization has led to the origin of a new avian species at the genomic level.