



## Master project 2021-2022

### Personal Information

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### Project

## Computational genomics

#### Project Title:

Discovering new targets for malaria vector control strategies in urban settings

#### Keywords:

malaria, Structural variants, adaptation, urbanization, transposable elements

#### Summary:

Malaria is a deadly disease that kills ~400.000 people per year mostly in Africa, but also in other worldwide regions. Urban environments were until recently considered to be unfit for Anopheles larvae development. However, during the last decades the two major African malaria vectors, *Anopheles gambiae* and *An. coluzzii*, have rapidly adapted to polluted habitats threatening current vector-control strategies. While genomic approaches have already been applied to develop vector-control strategies, so far they have focused on single nucleotide changes in coding regions applied to traits previously known to be relevant for the mosquito vector capacity, such as insecticide resistance. This project puts forward a new strategy based on the emergent field of urban adaptation to identify new genetic and epigenetic targets for malaria vector control. The project aims are (i) identifying all the genetic variants present in *Anopheles* genomes including SNPs, transposable elements, and copy number variants; (ii) identifying signatures of selection at the DNA level to pinpoint the most relevant genes for urban adaptation; and (iii) identifying the environmental factors more relevant for adaptation to urban environments. This project goes beyond the state-of-the-art by combining two emerging fields of research, urban adaptation and the functional role of structural variants, to tackle a relevant societal challenge that not only affects African countries, as re-emergence of malaria associated with climate change and increased human mobility is already being recorded in non-African countries.

#### Expected skills::

NGS data processing

#### Possibility of funding::

To be discussed

#### Possible continuity with PhD: :

To be discussed

#### Comments:

An interview to further discuss the project is required before acceptance to the lab

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