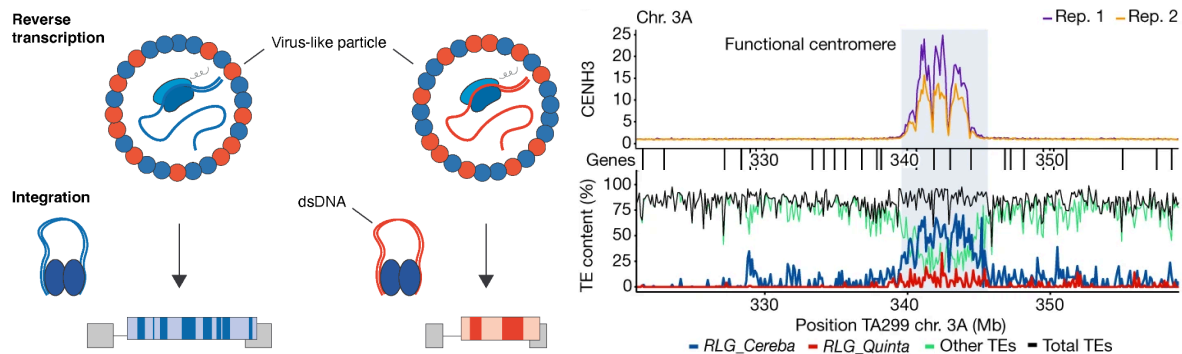


## Master thesis project



### Understanding centromere targeting of centromere-specific transposable elements

Centromere function is highly conserved across eukaryotes, but the underlying centromeric DNA sequences vary dramatically between species. They often contain a high proportion of repetitive DNA, such as tandem repeats and/or transposable elements (TEs).

A subset of TEs have developed the ability to specifically insert their DNA into centromeres which act as their genomic niche. This is hypothesized to be a competitive advantage for the TEs themselves, but also to contribute to the stability of centromeres, and therefore benefit the host genome.

How this centromere-specificity is achieved is not yet understood. To better understand this phenomenon the goals of this master project are:

1. Detailed characterization of recent centromere specific TE insertions in a recently hybridized grass genome.
2. Comparative genomics of centromere specific TE proteins across multiple kingdoms of life.
3. Protein structure prediction using Alphafold2.
4. Co-IP of TE proteins and interaction candidates.
5. Site-directed mutagenesis to identify critical amino acids involved in centromere specificity.

Based on the outlined aims, the project is expected to involve around 50% bioinformatics work and 50% wet lab work, but this ratio can be adjusted according to the students needs and project outcomes.

The MSc Thesis project will be integrated in the lab of Prof. Dr. Thomas Wicker, a leading expert in comparative genomics of crops and their fungal pathogens, as well as transposable elements. Our group is part of the Department of Plant and Microbial Biology (UZH), located in the Botanical Garden (Zollikerstrasse 107, 8008 Zurich). We are also flexible and open to suggestions for project ideas.



Prerequisites: Programming skills are not required, but it is of advantage if the thought of programming does not scare you.

Suited for: Master students in biology or related fields.

Supervision: Matthias Heuberger ([matthias.heuberger@botinst.uzh.ch](mailto:matthias.heuberger@botinst.uzh.ch));  
Prof. Dr. Thomas Wicker ([wicker@botinst.uzh.ch](mailto:wicker@botinst.uzh.ch))

*For ETH students: an additional supervisor from ETH is needed. This can be arranged by asking a professor/group leader; we already had MSc students from ETH in the past, and we are ready to help with this organizational aspect.*

Starting date: Open

Language: English or German

Please contact us if you are interested or have any further questions!