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## Annotation transfer in pangenome graphs

Nina Marthe

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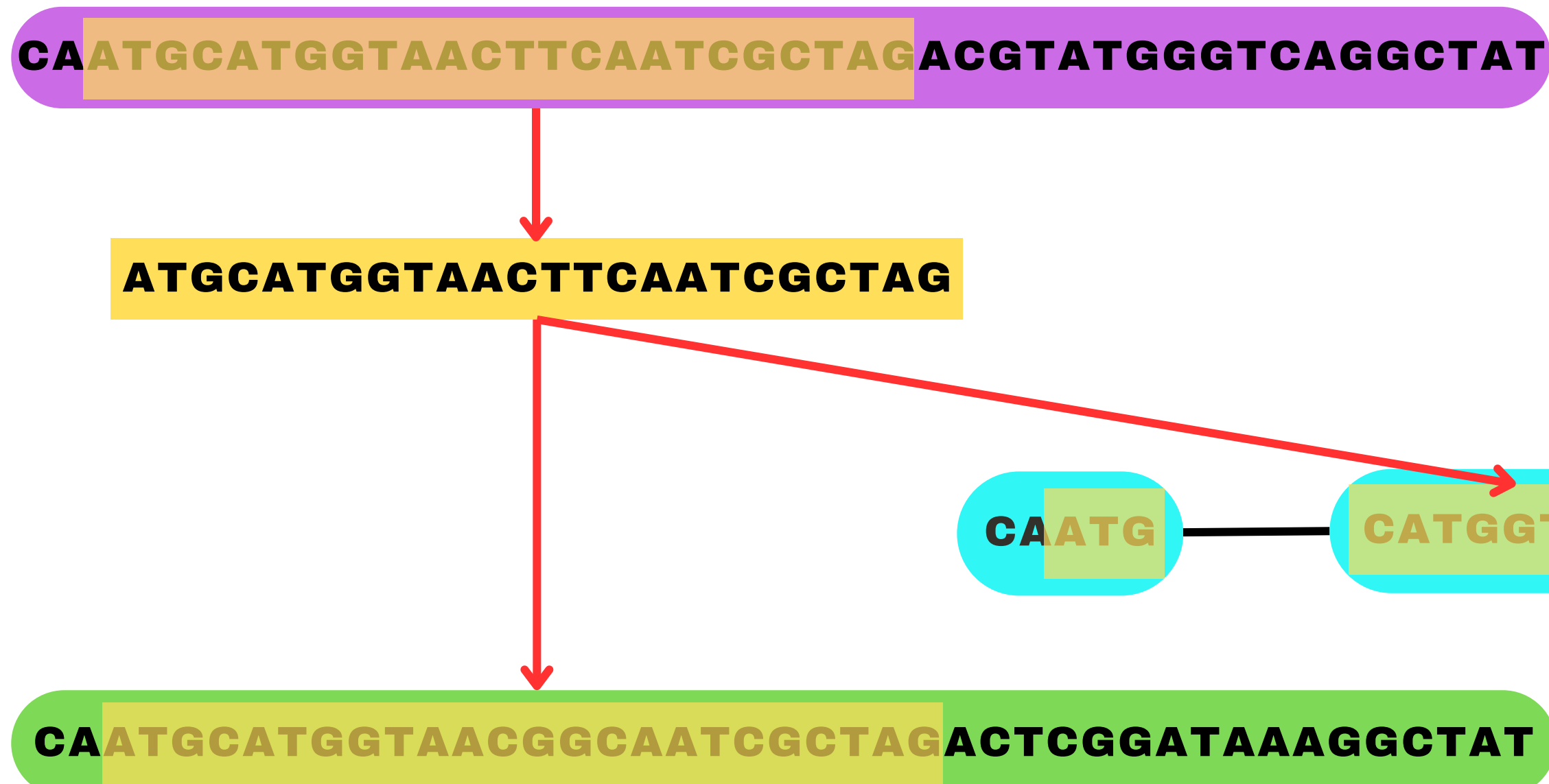


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Nina Marthe, nina.marthe@ird.fr

Annotation transfer usually consists in aligning the annotated sequences on the genome we want to transfer to. This approach can be applied to pangenome graphs, however it sacrifices precision to reduce runtime. Pangenome graphs allow another approach for annotation transfer that doesn't rely on alignment, since it simply converts the annotated region's coordinates to get their position in the graph.

## Traditional annotation transfer

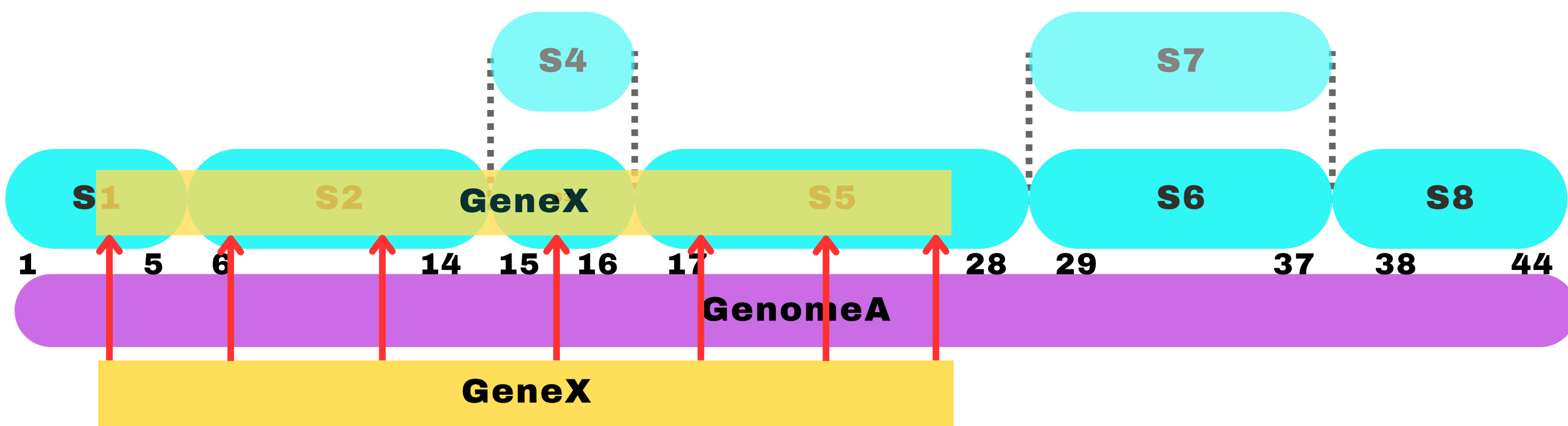


- Extract the sequence of the annotated region
- Align it on the target genome/pangenome
- Report the annotation where the sequence aligned best

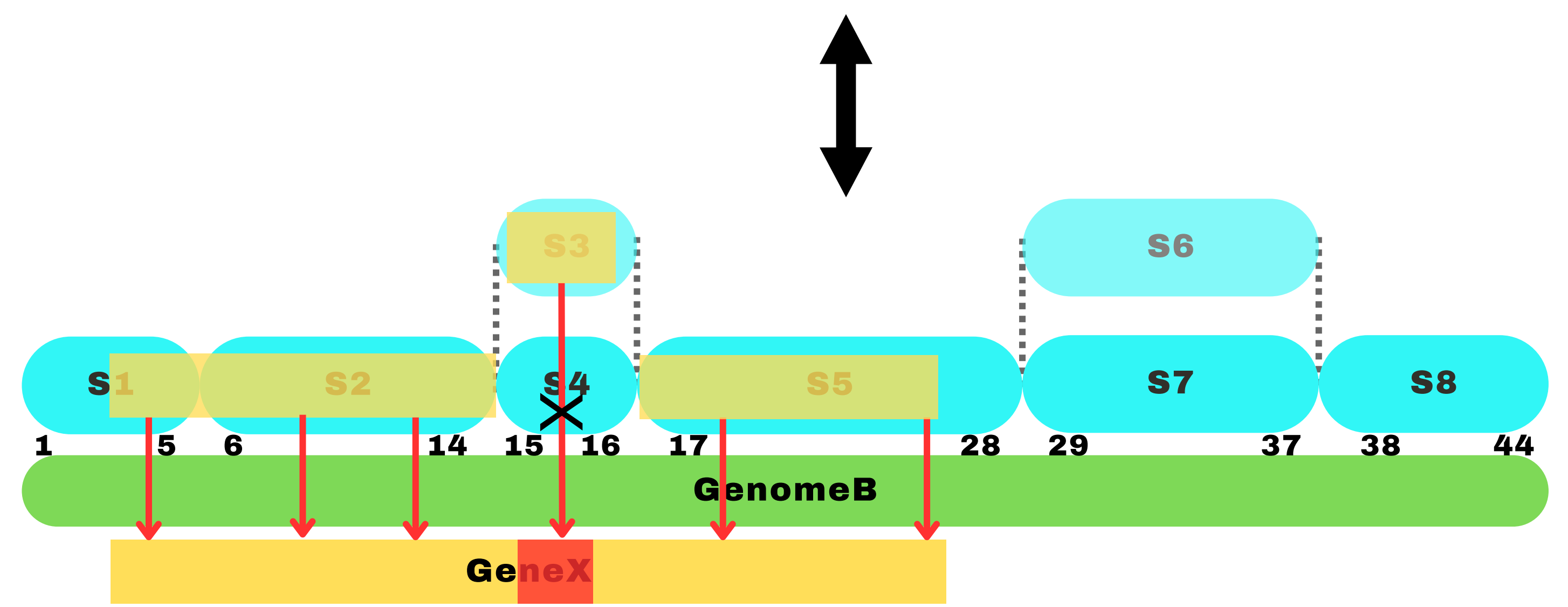
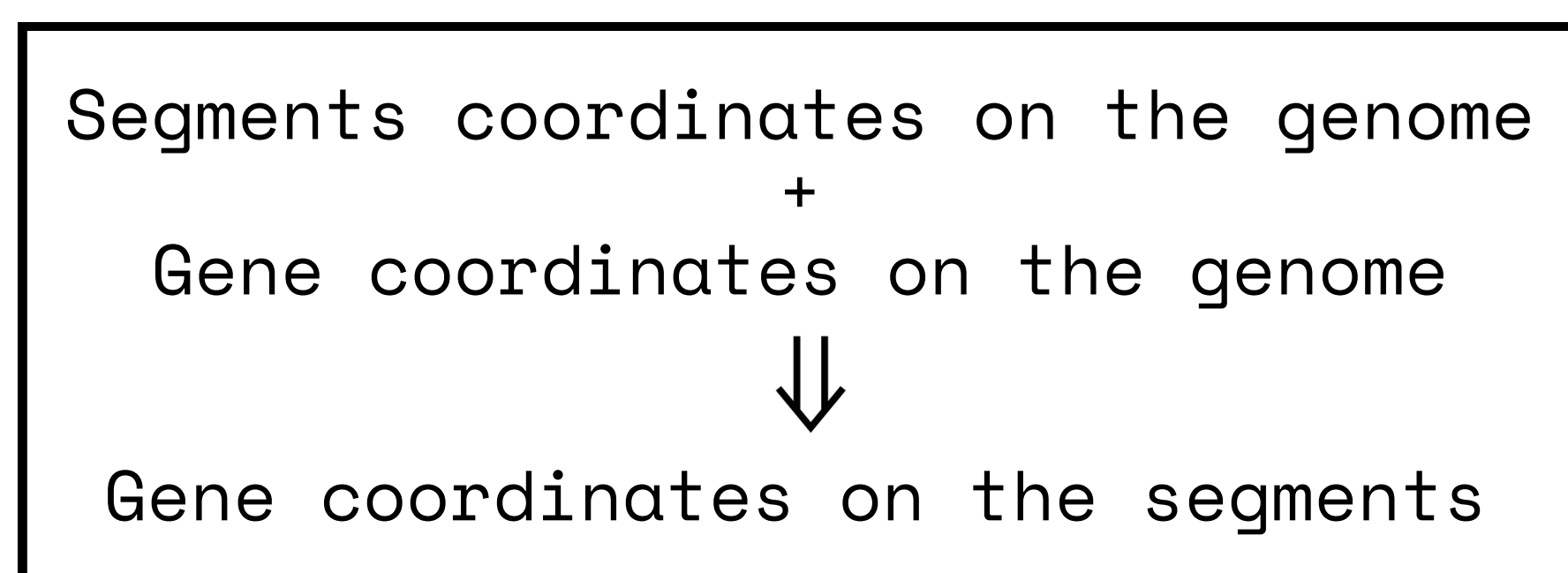
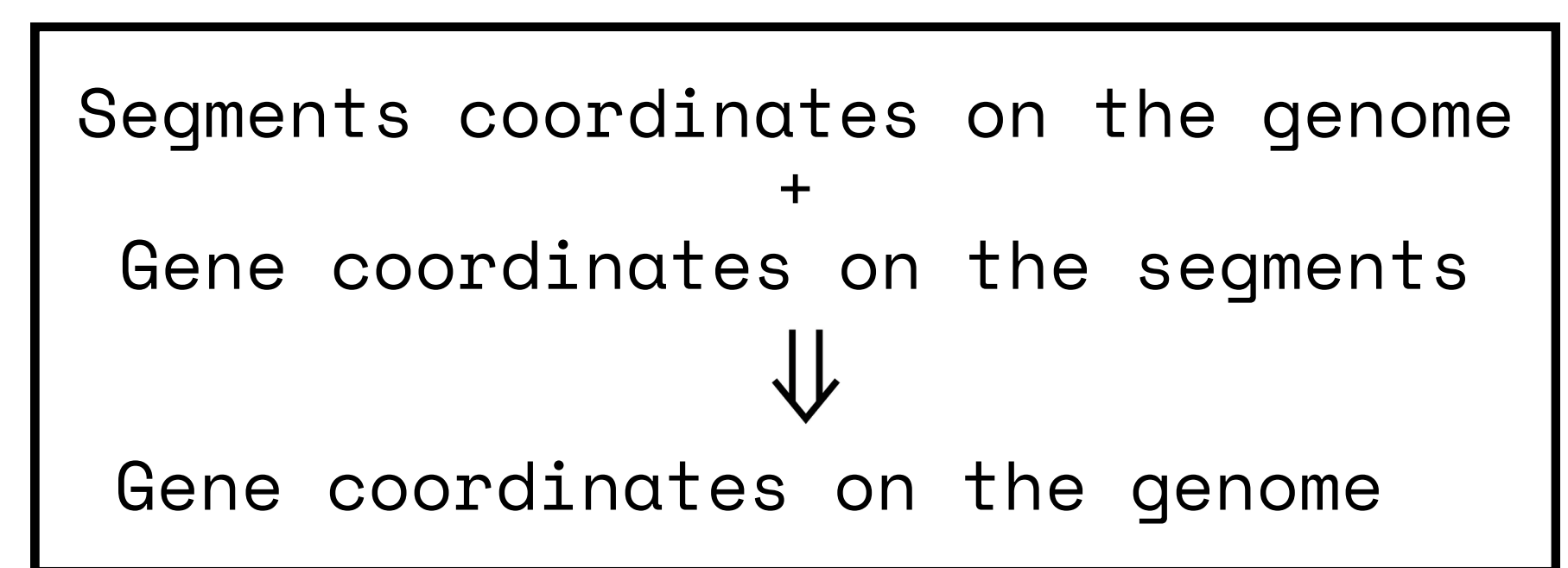
- Approximate solution (heuristic solution)
- Sacrifices precision to reduce runtime

## Annotation transfer using coordinate conversion

Annotation transfer from genome to graph



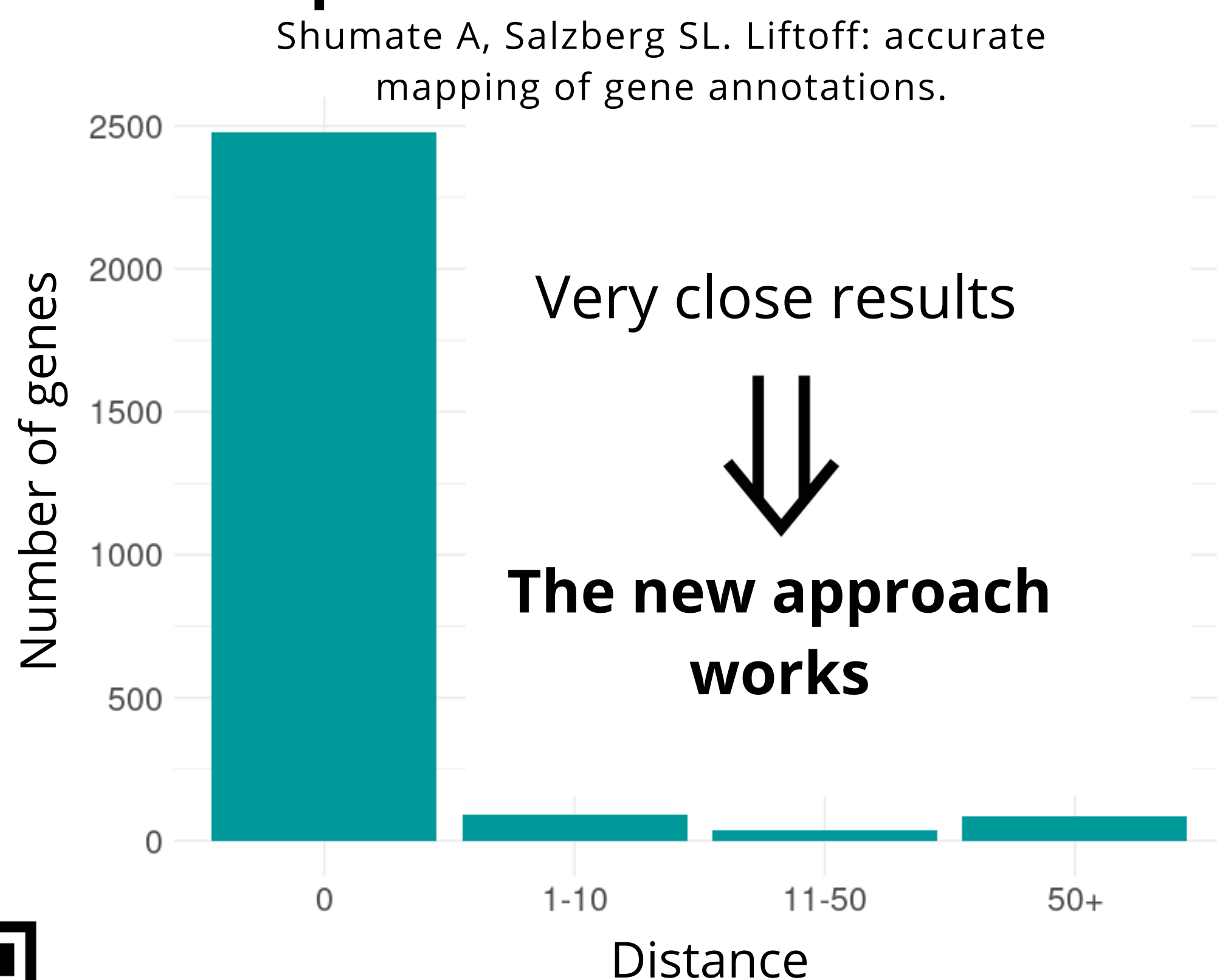
Annotation transfer from graph to genome



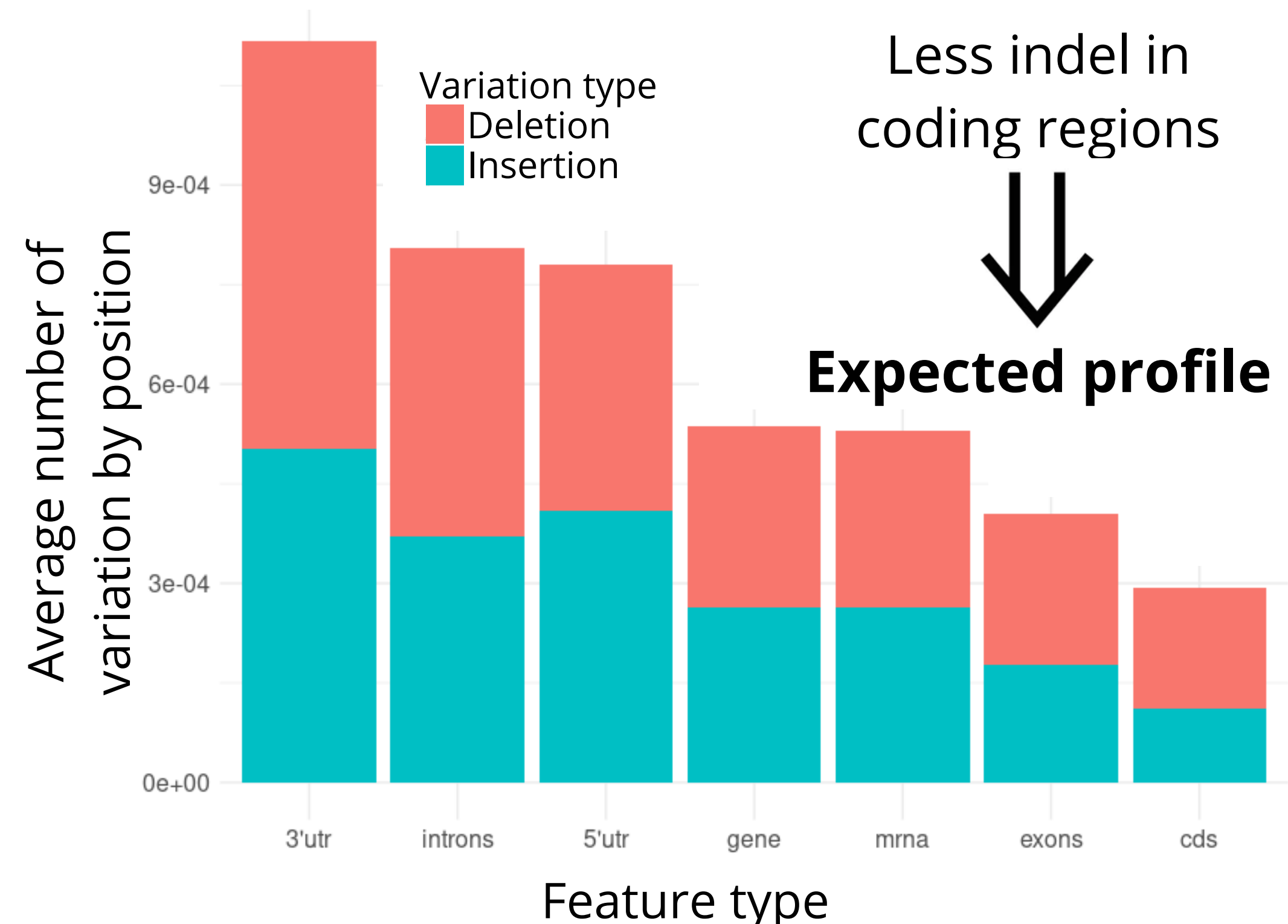
- High precision (exact solution)
- No sequence information needed
- Uses simple operations

- High precision (exact solution)
- Cannot miss a part of the gene
- Can detect modifications of the gene

## Comparison with Liftoff transfer



## Indel distribution in genes



**This new approach provides an exact solution to annotation transfer. It should prove valuable to both genome and pangenome studies, and allow for a better harnessing of the information contained within the pangenomes.**

Implemented in python  
within GrAnnot