

## Master project 2020-2021

### Personal Information

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### Project

## Web development & bioinformatic tools

#### Project Title:

Computational approaches for efficient and safe engineering of human genomes

#### Keywords:

Gene editing, CRISPR, Synthetic Biology, Gene therapy

#### Summary:

Our laboratory is focused on applied synthetic biology for therapeutic purposes. We have two lines of research, one in technology development for gene therapy, and one in skin microbiome engineering. Advanced cell and gene therapies are gaining important impact in medicine. We currently have more than 2,500 on-going gene therapy trials on multiple diseases (cancer, genetic disease, infectious disease, etc...). However, multiple concerns have been raised on the safety of current technologies which prevent a wider deployment. Uncontrolled on-target, pro-cancer pathway activation, controversy on off-target, and lack of efficacy still represent a major concern. We are offering a Bioinformatics master thesis position in developing computational approaches to develop more precise technologies for gene editing. AI and genomics provided tools to significantly improve design (Chuai et al, Genome Biology 2018; Doench et al, Nat Biotech 2016; ...). Nevertheless, these approaches remain not predictable enough for therapeutic purposes. We are developing new algorithms which use clinically relevant data to improve prediction significance for therapeutic purpose.

#### Expected skills::

Basic statistics and programming

#### Possibility of funding::

Yes

#### Possible continuity with PhD: :

To be discussed

