**PROJECT PROPOSITION - Lab1** (M1, second semester)

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Hosting lab: CBS

Period of proposed project (put **x** instead of ロ) :

ロ Only 1st slot **x** Only 2nd slot

ロ One slot, but I have no preference on which ロ Both slots (with different groups)

1st slot: thursdays and fridays, from 3/2/2021 to 18/3/2021

2nd slot: thursdays and fridays (except for the last 2 weeks), from 31/3/2021 to 6/5/2021

Gene expression economy

Subject (5 lines max for the description)

Protein burden, i.e. the decrease of cellular growth forced by the cost of heterologous gene expression, is an unavoidable effect when attempting to produce proteins at high yields. Here we will study how heterologous gene expression will impact growth by varying the supply/demand of the translation machinery. The project is both theoretical (based on ongoing work) and experimental, aimed at rationalising new [growth laws](https://www.science.org/doi/10.1126/science.1192588).

Technical tools to be used:

* Analytical tools to understand phase diagrams of traffic systems;
* Simulations (Gillespie-like);
* plate reader (and eventually flow cytometer) to determine fluorescence levels and growth rates;
* RNA and protein extraction.

Objectives:

* Understanding the model developed and (for the motivated ones) adapt it to the system;
* Design the experimental workflow based on the SynBio practicals.
* Measure fluorescence level and growth rate for all constructs available or produced, at different conditions (growth media).
* Measure RNA/protein content as a proxy for ribosomal content.
* Analyze data and compare to the model predictions.