Contribution ID: **30** Type: **not specified**

From Single-cell Behavior to Collective Dynamics

Wednesday 8 February 2023 10:15 (15 minutes)

The motion of swimming microbes has shown to be a good representation of their behavior, which in turn is unique for a given strain of cells. We want to understand how single-cell behavior relates to collective behavior of microbes. For instance, two mutants from the same species may exhibit distinct single-cell swimming behaviors. Does their collective behavior also differ? And if so, are those regimes related? To answer these questions, we will focus on the microbe *Chlamydomonas reinhardtii*, a green (photosynthetic) unicellular algae that swims. Their behavior will be characterised by recording cells motion with an in-house built microscope and a recording system consisting of a Raspberry Pi system-on-chip computer coupled to a High-Quality camera. Cells will swim inside microfluidic traps, restricted to the field of view of the microscope. By building an array of about 10 low-cost microscopes, we aim at obtaining a large amount of data, improving statistical significance. Its analysis will allow to relate single-cell behavior to collective dynamics of various *Chlamydomonas* mutants (WT, *mbo1*, *mbo2*, *ida*, *oda*, etc.), with constant environmental conditions, and of one mutant, with varying environmental conditions (e.g., temperature, illumination, chemical composition of the cells media). This will enable the characterisation of models mapping single-cell to collective behaviors, as well as maps between environmental conditions and behavior, both at the single and collective scales. Quantitative descriptions of this kind, relating behavioral to environmental parameters, can be extended to other swimming microbes, giving clues about how these are affected by climate conditions.

Author: Ms COSTA, Camila (IGC; INESC MN)

Presenter: Ms COSTA, Camila (IGC; INESC MN)