

## **Unicellular algae for sustainable production of bio-commodities and nanoparticles**

*Tomas MOROSINOTTO, Dipartimento di Biologia, University of Padova*

Global demand of biomass for production of fuels, food, feed and other uses is continuously expanding due to the growth in world population. This increase in demand must be satisfied while also decreasing greenhouse gas emissions to mitigate the deleterious effect of climate change. It is therefore crucial that novel and sustainable strategies to produce biomass are developed.

Algae represent a valuable alternative to produce several bio-commodities such as lipids that can be transformed into biodiesel, proteins for food and feed and high-value molecules. Algae have a high productivity per surface and do not compete with crops for fertile land. Thanks to their efficiency in carbon dioxide (CO<sub>2</sub>) fixation, algae large scale cultivation could also largely contribute to the mitigation of anthropogenic greenhouse gas emissions.

Despite this promising potential, algae economic exploitation is presently limited to niche markets and scientific and technological challenges needs to be addressed to expand their application. We will discuss these challenges and how genetic modifications can be strategic to improve biomass productivity in algae large scale cultures and the use of mathematical models for optimization of cultivation conditions.

Finally, the perspectives of using algae and their natural enzymatic activities for the synthesis of interesting nanomaterials will be discussed.