Presenter Bio - Tasios Melis, Professor, UC Berkeley

A Professor at the University of California Berkeley, Tasios Melis envisioned and pioneered the concept of “Photosynthetic Biofuels”, entailing the direct application of photosynthesis for the generation of bioenergy, in a process where a single organism acts both as photocatalyst and processor, synthesizing and secreting ready to use fuels. This has been successfully applied to hydrogen production and specific hydrocarbon products.

The Melis lab contributed with a breakthrough in the field, when several years ago they demonstrated, for the first time, how to divert the natural flow of photosynthesis in green microalgae and to sustainably generate hydrogen gas, instead of the normally produced oxygen. This technology is currently employed by many laboratories in several countries, and serves as the platform for further hydrogen production research in the field.

Professor Melis also pioneered and currently leads an international effort to improve, by up to 300%, the efficiency and productivity of photosynthesis in mass cultures under bright sunlight conditions. This can be achieved upon genetically optimizing the size of the array of chlorophyll molecules that serve as antennae to absorb sunlight for the photosynthetic apparatus.

In 2010, the Melis lab pioneered yet a new platform for the renewable generation of isoprene (C_5H_8) hydrocarbons, derived entirely from sunlight, carbon dioxide (CO_2) and water (H_2O), and generated immediately from the primary products of photosynthesis. The process of generating isoprene (C_5H_8) hydrocarbons, currently serves as a case study in the development of technologies for the renewable generation of a multitude of biofuels and other useful bio-products. Professor Melis has been funded by the U.S. Department of Energy’s Fuel Cell Technologies Program.