

OMEGA: A life-support system for spaceship earth

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With Dr. Jonathan Trent

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Abstract:

OMEGA emerged from NASA's Advanced Life Support research that allows us to contemplate human exploration of Mars and helps us address looming problems with energy, water, and food here on Earth. OMEGA, an acronym for "Offshore Membrane Enclosures for Growing Algae," began as a project to grow algae for biofuels and evolved into an ecosystem of technologies that generates sustainable energy, turns wastewater into drinking water, and provides food without using land.

OMEGA combines and optimizes new and emerging technologies for energy production, wastewater purification, and aquaculture. In protected ocean bays, OMEGA's floating platforms are covered with water-cooled solar panels that produce electricity and heat. The electricity runs pumps that circulate nitrogen- and phosphorus-rich wastewater through a network of clear, flexible plastic tubes to grow oil-rich algae, which are harvested and processed into biofuels.

We will discuss the \$10.8 million OMEGA feasibility study supported by NASA and the California Energy Commission from 2010 to 2013 and the OMEGA Global Initiative (OGI), a recently founded nonprofit corporation 501(c)(3) to identify OMEGA sites, mobilize local OMEGA developers, mitigate developmental risks, and facilitate successful OMEGA implantation, operation, and, ultimately, commercialization globally.

Biography:

After receiving his Ph.D. in Biological Oceanography at Scripps Institution of Oceanography, Dr. Trent spent six years in Europe at the Max Planck Institute for Biochemistry in Germany, the University of Copenhagen in Denmark, and the University of Paris at Orsay in France. He returned to the USA to work at the Boyer Center for Molecular Medicine at Yale Medical School for two years before establishing a biotechnology group at Argonne National Laboratory. In 1998 he moved to NASA Ames Research Center to be part of NASA's Astrobiology program and in 1999 he founded the Protein Nanotechnology Group. In 2007, with support from Google, he began a project called "Sustainable Energy for Spaceship Earth," which led to the OMEGA project. From 2010–2013 he led a multidisciplinary OMEGA research group with funding from NASA and the California Energy Commission. In addition to working at NASA, he is concurrently an Adjunct Professor in both the Dept. of BioMolecular Engineering at UC Santa Cruz and in the Dept. of Biotechnology and Life Sciences at Tokyo University for Agriculture and Technology. He is also a fellow of the California Academy of Sciences and the Acting Director of the 501(c)(3) OMEGA Global Initiative (OGI).



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