

## ENI AWARD 2011

### *Renewable and Non-conventional Energy Prize*

#### Winner

**Gregory Stephanopoulos**

***Engineering Microbes for Biofuel Production from Renewable Resources***

#### **Biography**

Gregory Stephanopoulos was born in Kalamata, Greece, in 1950. At present, he is the W. H. Dow Professor of Chemical Engineering and Biotechnology at the Department of Chemical Engineering, Massachusetts Institute of Technology (MIT).

After attending to National Technical University of Athens, where in 1973 he achieved his Diploma of Chemical Engineering, he continued his studies in the United States. In 1975 he obtained his M.S. from the University of Florida and, three years later, his PhD degree from the University of Minnesota.

His professional career started in 1978 as Assistant Professor at the Caltech, while in 1984 he became Associate Professor. Since 1985, Gregory Stephanopoulos has been a Professor of the Massachusetts Institute of Technology: he was the Bayer Professor from 2000 to 2006 when he was appointed to the W. H. Dow Professorship.

From 1990 to 1997 he served as Associate Director of the Biotechnology Center at MIT.

Since 1997, he also worked as Lecturer on Surgery and Bioengineering for Harvard University, while he spent the academic year 2006-2007 as Visiting Professor at the ETH Zurich.

The professional career of Professor Stephanopoulos is underscored by his prolific scientific production: he is the co-author of a book and the editor of five other titles, while he wrote or co-authored about 340 papers and 40 patents. During his tenure, he trained and supervised more than 120 graduate and Post-Doc students; he collaborated with many scientific journals as a member of their Editorial Boards, like *Mathematical Biosciences* (1984-1998), *Bioprocess and Biosystems Engineering* (2000-2005). He currently serves on the editorial boards of 12 scientific journals such as the *Annual Review of Chemical and Biomolecular Engineering*, the *Journal of Biotechnology* and *Trends in Biotechnology*. Since 2003, he is the Editor-in-Chief of *Metabolic Engineering* and since 2010, co-Editor-in-Chief of *Current Opinion in Biotechnology*.

The importance of his outstanding research was highlighted in 26 named Lectureships. In 1991, he was appointed Merck Lecturer; in 1996, Inaugural Bayer Lecturer from the University of California at Berkeley. In 2002, the University of Minnesota nominated Professor Stephanopoulos as the inaugural A. G. Fredrickson Lecturer, while in 2003 the Purdue University acclaimed him the Kelly Lecturer, the University of Colorado the Patten Distinguished Lecturer, and, in 2004, the Georgia Institute of Technology appointed him the Cary Lecturer. In 2005 he gave the McCabe Lecture at NC State University and in 2008 the inaugural Founders Lectureship at UCLA. In 2010, he became the Pigford Distinguished Lecturer at the University of Delaware.

During the years, Professor Stephanopoulos received many honors. Among others, in 1973 he received the CHRISOVERGION Award from the Athens Polytechnic, in 1984 the Presidential Young Investigator Award, in 2001 the Marvin J. Johnson Award from the American Chemical Society. In 2007, he received the Charles Thom Award from the Society for Industrial Microbiology, in 2009 the Amgen Award in Biochemical Engineering and, in 2009, the Aristoteles Award for Excellence in Biosciences Research.

In 2010 he received the George Washington Carver Award for Innovation in Industrial Biotechnology while, in the same year, the ACS tributed him the E. V. Murphree Award.

Gregory Stephanopoulos was elected Member of the National Academy of Engineering in 2003, while in

2005 he was nominated Doctor technices *honoris causa* from the Technical University of Denmark. In the same year, he became a Fellow of the AAAS. He has also received the following awards from the American Institute of Chemical engineers (AIChE): the FPBE Division Award (1997), the R.H. Wilhelm Award (2001) and the Founders award in 2007.

Professor Stephanopoulos currently works in Cambridge, at the Department of Chemical Engineering, focusing on biotechnology and bioinformatics, on metabolic and biochemical engineering. He is the Director of the Bioinformatics & Metabolic Engineering Laboratory at MIT. His group of 25 graduate students and post-docs conducts research on inverse metabolic engineering, flux determination, metabolomics, systems biology and metabolic engineering of *E.Coli* for the production of fuels biochemicals.

Gregory Stephanopoulos, Dow Professor of Chemical Engineering and Biotechnology at MIT, pioneered the emerging field of Metabolic Engineering. He is mostly renowned for his studies on the Global Transcription Machinery Engineering technology, concerning the reprogramming of the gene transcription of particular bacteria, in order to modify their microbial cells, increasing their efficiency in transformation of raw material in hydrocarbons. Until now, the best result concerns the increase in tolerance of microbial cultivations to the toxicity of several products, and the consequent, relevant increase of productiveness in biofuels.

Because of the great relevance of this subject, oriented to the production of second generation biofuels starting from raw materials that are not in competition with the food field, the Scientific Commission conferred to Professor Gregory Stephanopoulos the "Renewable and Non-conventional Energy Prize".