# Design and Evolution of Metabolism for C1 Assimilation in Microbes and Plants


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It has been estimated that terrestrial photosynthesis draws down 120 giga tons of carbon per year, half of which is released back to the atmosphere by respiration. The remaining carbon is slowly converted to CO2 and CH4 due to microbial metabolism.To date, burning of fossil fuel emits more than 10 giga tons of carbon annually, which upsets the natural balance of the carbon cycle and caused a rapid increase of atmospheric greenhouse gas (GHG) in recent years. With advances in biochemistry, molecular biology and cell biology, it has become possible to design and evolve new metabolism with an aim for reducing GHG in the atmosphere. Here we will present examples of how design and evolution can be used to explore new metabolism in E coli, cyanobacteria Synechococcus elongatus, and Arabidopsis.

Dr. James C. Liao received his BS degree from National Taiwan University and PhD from University of Wisconsin-Madison. He is an expert of metabolic engineering and synthetic biology. After working at Texas A&M University and UCLA for decades, he moved back to Taiwan in 2016 and has served as President of Academia Sinica since then.

Dr. Liao is a member of US National Academy of Sciences, National Academy of Engineering, and Academia Sinica in Taiwan. Dr. Liao received numerous awards, including the US Presidential Green Chemistry Challenge Award (2010), the White House Champion of Change in renewable energy (2012), the ENI award for renewable energy (2013), the Novozyme Award for Excellence in Biochemical and Chemical Engineering (2019), and the Samson Prime Minister's Prize, Israel (2021).