

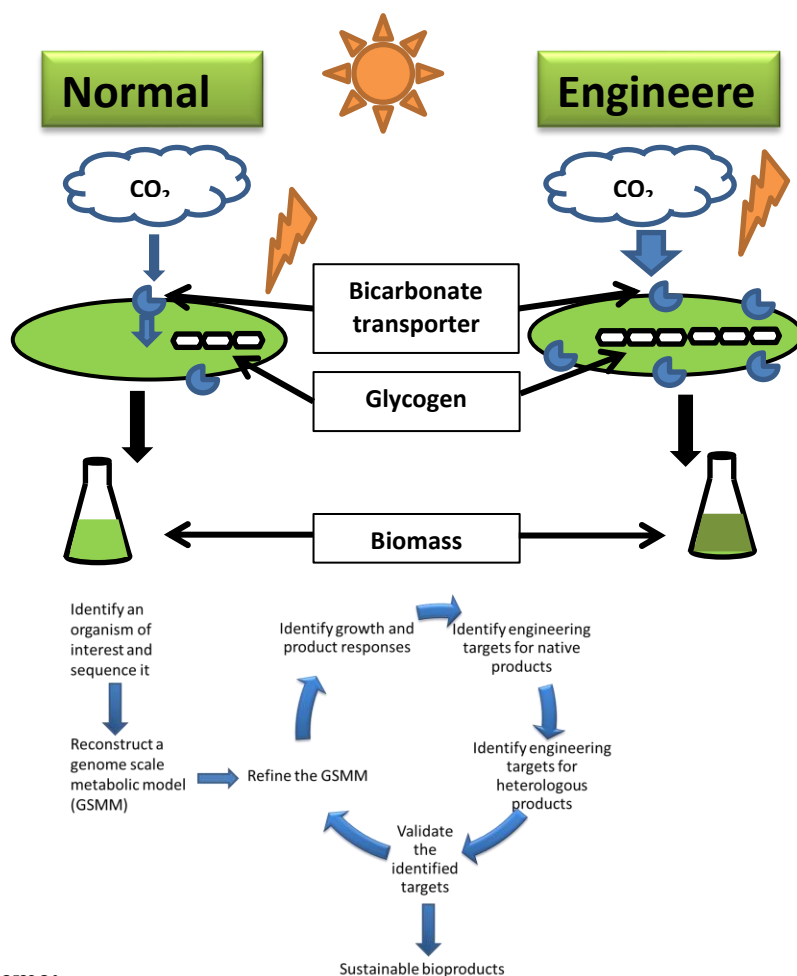
Invited Lecture
Inter-Disciplinary Explorations in Chemistry (I-DEC 2018)

Taking a Biotechnological route to Sustainable Fuels and Chemicals: *in silico* and *in vitro* investigations

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Abstract: Fossil fuels and plastics are the most unsustainable commodities that we are dependent upon. India is especially vulnerable because ~85% of our oil is imported, exerting a significant strain on our economy and the value of rupee. Another “burning” problem our country faces is agricultural waste, a potential goldmine that is burnt every year, giving the country the dubious distinction of being the most polluted country of the world and creating a significant health hazard for the ordinary citizens in the upper part of the country. Biofuels and bioproducts offer potential solutions to these problems, but several challenges need to be solved to make them economically sustainable; a primary among them is the lower rates and yields of products. I will present the *in silico* analysis of genome scale metabolic models as a way to generate useful info about the bioproducts that can be formed by an organism and to identify engineering targets to increase their yield while minimizing impact on growth. I’ll also present the genetic engineering done in the lab to improve carbon fixation in cyanobacteria, the oldest unicellular photosynthetic organisms that can serve as an important feedstock for production of a variety of compounds by the heterotrophic organisms.

Figure: Genetic engineering to increase biomass and glycogen productivity.



Scheme:

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References and Notes:

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Bio-Sketch of Speaker

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Shireesh Srivastava is Group Leader of Systems Biology for Biofuels group at ICGEB, New Delhi and an investigator in the DBT-ICGEB Center for Advanced Bioenergy Research. He had earned his PhD in Chemical Engineering from Michigan State University (MSU), winning the Sigma Xi award for excellence in graduate studies. He conducted his postdoctoral research work in the National Institutes of Health (NIH), in the area of metabolism and won the Fellows Award for Research Excellence (FARE) for his research in 2011. He joined ICGEB in 2012. He has published 23 research articles in reputed peer-reviewed journals in the field of metabolic systems biology and metabolism. Research in his group relates to improving growth or product formation rates through application of systems biology and metabolic engineering. A variety of organisms such as marine cyanobacteria, *E. coli*, yeast and fungus are being investigated in his lab for biofuel applications.