

MOLECULAR SIGNATURES ALONG THE GROWTH CURVE OF A DIATOM UNDER DIFFERENT CO₂ CONDITIONS

Mónica V. Orellana^{1,2}, Justin Ashworth¹, Allison Lee¹, E. Virginia Armbrust² & Nitin S. Baliga¹

¹Institute for Systems Biology

²University of Washington

Diatoms are important primary producers that play an important role in the marine carbon cycle and over geological times have influenced global climate. The success of diatoms in global oceans relies on a combination of traits, including their molecular physiology allowing their adaptation and evolution to different environments. We have conducted genome-wide transcription profiling of the model diatom *Thalassiosira pseudonana* during a growth curve at two CO₂ levels, present day and a doubling CO₂ level reflecting the projected scenario for the 21st century. The growth reveals large, reproducible cell-state transitions between two conditions: a) exponential and nutrient replete, b) stationary and nutrient depleted, phases of growth. In this presentation we will focus on the analyses of metabolic modes associated with the cells states under the two CO₂ conditions. This work demonstrates the power of a system biology approach to understanding the mechanisms and regulation during growth of a model diatom under different conditions.