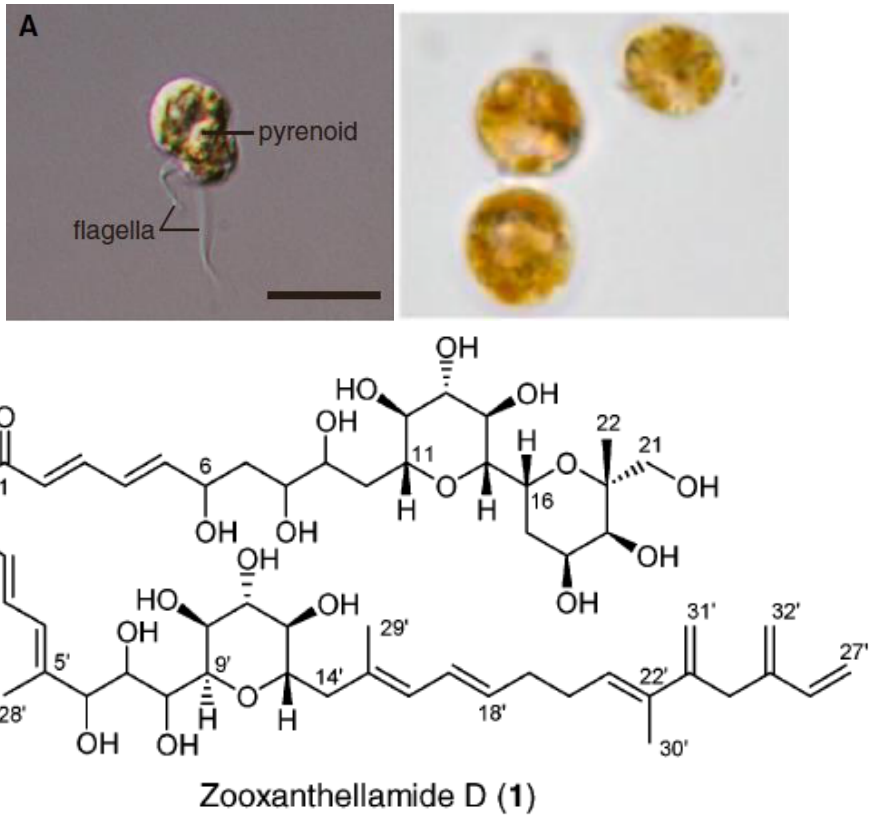
Title: Dinoflagellates *Symbiodinium minutum*: Polyols polyketides and their biosynthetic molecular machinery, Polyketides synthase (PKS) genes

Abstract: Dinoflagellates, blue-green microalgae/cyanobacteria, are unicellular microalga. They exist as free living and symbiotic and are primary photosynthetic biomass producers and at the top of the marine food chain. Thus, they have tremendous roles in the marine biodiversity and ecology. Dinoflagellates are well-known as photosynthetic symbiont for corals and other non-photosynthetic hosts. They are also prolific producers of biologically active secondary metabolites/toxins, such as mycosporine amino acids, lipids, and polyketides (macrolides, linear and polycyclic polyols etc). Dinoflagellates mass proliferations (algal bloom) are beneficial to marine aquaculture and wild fisheries; on the other hand, however, harmful algal bloom (red tide toxins) causes devastating effect on marine ecology, economy, environment, and public health worldwide.

Besides the defense and proliferation, the full functions of these metabolites/toxins are relatively unknown in the producing organisms and their hosts. To study the molecular mechanism of these metabolites, it is essential to know their biosynthetic production process and molecular machineries. Having the decoded nuclear genome of *S. minutum*, we surveyed the assembled genome sequence and found 25 polyketides synthase (PKS) genes encoding proteins with mono- and multifunctional domains. The genes contain minimal catalytical domains set and modular nature of Type I PKS to produce polyketides. In addition, *S. minutum* PKS genes are diversified: i) dinoflagellate specific PKS genes with single domains, ii) multifunctional PKS genes with KS domains orthologous to those of other protists, and iii) PKS genes of bacterial origin. In this seminar, I will introduce *Symbiodinium* secondary metabolites (diversities, biological activities, extraction, and detection) and briefly their biosynthetic modules as identified on its nuclear genomes.



Zooxanthellamide D (**1**)