

Speaker: Natalia Prieto Vidal, Tenure Track Assistant Professor, Department of Food Chemistry and Technology, Aarhus University

Title: Betaine Lipids: The Underexplored Polar Lipids in Marine Algae

**Abstract:**

Brown macroalgae represents a sustainable and abundant source of lipids with acknowledged functional and health benefits. The comprehensive lipidomic analysis of macroalgae from Nordic areas, including the invasive *Sargassum muticum*, has revealed that up to 25% of total lipids accounted for polar lipids and exhibited a very diverse profile. Betaine lipids (BL), glycolipids, phospholipids, and sphingolipids are present in this lipid fraction and their content is dependent on species. Some species exhibit up to 78% of BL, with up to 73% PUFA content. BL are structural polar lipids that substitute phospholipids (i.e. phosphatidylcholine, PC) in extraplastidial membranes of algae, particularly under phosphate starvation conditions. However, despite the large abundance of betaine complex lipids in some species, their biological activities and their role in human health remain poorly explored. Interestingly, although BL and PC are structurally very similar, the few studies available show that BL-lipid membranes of algae seem to exhibit more rigidity, thickness, and show higher repulsive hydration interactions compared to plant PC bilayers. Can betaine lipids be the next building blocks for lipid-based delivery systems? The polar lipidome of Nordic brown macroalgae has potential to be an emerging source of complex and bio-active lipids for food and high-end blue technology applications.