



## Physiological Plasticity of Bivalves Under Global Climate Change

**Dr. Omera Matoo, Friday, October 16, 2020**

3:00 – 4:00 PM, Zoom Virtual meeting room

**Presentation:** Continued increase in atmospheric CO<sub>2</sub> and its subsequent uptake by oceans profoundly affects marine ecosystems worldwide. Changes experienced by organisms include increase in global sea surface temperature and partial pressure of CO<sub>2</sub> (P<sub>CO2</sub>) of sea water, which leads to the ocean acidification and changes in seawater carbonate chemistry. Estuarine and shallow coastal areas, are especially prone to these changes because of low buffering capacity of brackish waters and large fluctuations of salinity in these habitats. As such, in these dynamic habitats the effect of multiple stressors on organisms can be complicated by the context-specific and non-linear dynamic interactions. Marine calcifiers are especially sensitive to these stressors as they serve ecosystem engineers and key foundation species in these habitats.

Here, I used a comparative bioenergetic framework approach to investigate plasticity at different levels of physiological organization (molecular to whole-organism) and ontogeny (early and late life-cycle stages) in three marine calcifying bivalves with different shell mineralogies – *Crassostrea virginica* (the Eastern Oyster), *Mercenaria mercenaria* (the Hard-shell Clam) and *Mytilus edulis* (the Blue Mussel). This research has resulted in three findings: (1) ocean acidification, independently or in combination with other stressors has negative effects on the survival, growth, bioenergetics, and biomineralization in these bivalves, (2) plasticity to these stressors are species-specific, and (3) early life stages are more sensitive to the impacts of these stressors. Quantifying these independent and interactive effects of multiple stressors to identify physiological tipping points is essential to determine the impact of global climate change on organisms and ecosystems and is of critical importance for conservation, policy and management.

**About the speaker:** After earning a BS and MS in Biology from Bangalore University (India), Dr. Matoo completed her PhD with Dr. Sokolova's lab at the University of Charlotte, North Carolina. Dr. Matoo is currently a Research Assistant Professor at the University of Nebraska-Lincoln and an integrative biologist by training. Her research program investigates how organisms maintain fitness under environmental and genetic stress using both terrestrial and aquatic organisms (model and non-model) to untangle the casual mechanisms of genome-environment-phenome relationships. Specifically, she is interested in physiological plasticity of integrated performance traits in marine bivalves under global climate change. Towards the end of her graduate program, she became interested in how genetic structure and variation can shape the



underlying biochemical pathways of physiological change. With this in mind, she joined the Montooth lab at the University of Nebraska- Lincoln for her postdoctoral training where she used the genetic toolkit of *Drosophila* to investigate how mitochondrial and nuclear genomes, in different environmental contexts, affect metabolic and mitochondrial physiology. She is fascinated by all things mitochondria! Currently, she is extending these genome-to-phenome connections in the wild by using a freshwater mollusk – the New Zealand mud snail- which is model for co-evolutionary dynamics of mitochondrial and nuclear genomes and an invasive species in North America.

Being from an international conflict zone (Kashmir), Dr. Matoo is deeply passionate about diversity and inclusion in science. When not in lab or doing academic writing, she mentors students back home through non-profit organizations like JKscientists.org (<https://www.jkscientists.org/home>) and Kashmir Education Initiative (<https://www.kashmirei.org/>).

**Seminar information:** This seminar will be held virtually via Zoom. To log into the seminar please use the following web link:

<https://fresnostate.zoom.us/j/93828128141?pwd=K2NuaEExTGpLVWw0N2lvWnpETHMyQT09>

Passcode: 542050