

SIO 278: Multiple Stressors on the Marine Pelagic Environment (2 units)

Monday 2-3:50pm; Vaughan Hall 300

Marine pelagic ecosystems are facing new and intensified threats related to the impacts of human activities. This class focuses on a subset of the most important stressors (because we only have 10 weeks). Important to this course is the growing appreciation for the need to study these within a multi-stressor framework that also evaluates their interactive effect, as ecosystems are affected by varying combinations of different stressors with variable intensity depending on the region, and spatiotemporal scales.

This course is based on student-led discussions of the topics outlined below. Students will sign up to lead one or more discussions. The topics are set for each week, and a subset of papers for each topic is included, from which you will choose one and assign to the class for discussion. These papers are typically research articles, and a list will be provided the first week of the quarter. Students can request to select a different paper on the same topic, although you must provide a well-justified reason for your request, and it is subject to my approval. This must be requested at the start of the quarter and approval will be granted/not granted by week 2.

While the discussion leaders are responsible for leading the conversation, all students must read the papers and participate in the discussions. To enhance the quality of these discussions, student leaders can improve their knowledge on the topic by reading additional papers and come prepared with a list of topics/questions/issues/challenges, in the case that gentle prodding is needed to break the silence.

Weekly assignment (word document due on Canvas before class starts)

This assignment will help enhance the discussion. It is a brief write-up that should include *one to several sentences* for *each of the elements* listed below. In this short write-up please include:

- Paper citation
- Scientific questions addressed in the paper (are they well-formulated?)
- Basic methodology
- Main findings and implications
- Your assessment of how well the study goals were addressed, identifying major flaws or brilliant approaches with appropriate justification. If the authors addressed their questions perfectly (but not brilliantly), please comment on which part of the study was the most difficult to understand and why.

Topics

- Multiple stressors
- Warming: Secular trends, Marine Heatwaves, ENSO events
- Ocean acidification and hypoxia
- Plastics/Microplastics
- Pollution and wildfires
- Overfishing
- Nutrient alterations (due to various stressors e.g., pollution, warming, etc.)
- Noise pollution
- Persistent organic pollutants (e.g., PCBs, PFAS, PBDEs, OCPs)
- Climate geoengineering (e.g., iron fertilization, re-oxygenation, artificial upwelling)