Background

Phytoplankton: An Intro

Phytoplankton are microscopic, aquatic autotrophs from most kingdoms of life.

<u>Crucial for climatic and environmental stability:</u>

- Sequester 30% of CO_2 emissions (Rohr et al., 2023)
- Reflect solar radiation (Deppeler & Davidson, 2017)
- Base of the marine food web (Käse & Geuer, 2018; Loschi et al., 2023)
- Biogeochemical cycling of nutrients (Sarker et al., 2023)

Current Empirical Limitations

(Winder & Sommer, 2012)

<u>Factors Limiting Applicability of Phytoplankton Sudies:</u>

- *Non-uniform* changes in oeanic conditions
- *Non-uniform* biological preferences among different phytoplankton groups
- Complexity from *multiple environment parameters*
- Limited Data (Ratnarajah et al., 2022)
- Limited Scope of Individual Computational Models

Uni-Dimensional Empirical Analysis + DIsconnected Computer Models

(Chang et al., 2022)

Multi-Dimensional, Unified Computational Apparatus

A Highly Relevant Issue For Scientists and Policymakers

<u>UN Sustainable Development Goals:</u>

-Climate Action, Clean Water, Life Below Water (United Nations, 2015)