Microscopic plankton fuel coastal and oceanic ecosystems, providing 50% of global primary production and 30% of atmospheric oxygen. These small plants and animals construct their cells from dissolved elements (e.g. C, N, P, Si, Ca), with their short lives and violent deaths contributing to biogeochemical cycles.

Understanding the cellular physiology and ecology of plankton allows key insights into the species-specific contribution these organisms make to biogeochemical processes in the oceans of the past, present and future.

A cellular perspective of plankton ecology and physiology allows considerable insight into:

- Species-specific primary production
- Rates of elemental uptake & recycling
- Formation & export of bio-minerals
- Stoichiometry of uptake & release
- Contributions to ecosystem productivity
- Responses to climate variability