SOLS SNIPPETS—SUSTAINABILITY

Life in a changing Ocean

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Oceans cover three quarters of the earth's surface and biogeochemical processes in the ocean profoundly affect present day climate, as well as future climate change. For example, the ocean's biota mediates the atmospheric increase of the greenhouse gas CO2 by photosynthesis and subsequent sequestration of the fixed carbon in the food web (the Biological Carbon Pump). But the oceans themselves are changing in the course of global warming. By comparing information from stations in the open subtropical North Atlantic

Ocean obtained on research vessels, moorings and by satellite, we investigate if the biological carbon pump might become stronger or weaker in the future.

We are also investigating several aspects of marine plankton ecology in the laboratory. Projects range from the adaptation of sea ice organisms to cold temperatures to the feeding ecology of marine protists. Recently we have begun to combine classical microscope-based identification of marine phytoplankton with molecular methods to characterize phytoplankton diversity in the open ocean and examine how different taxa might contribute to the functioning of the biological carbon pump in an ever changing ocean.

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How do we recognize and describe similarity?

Michael S. Rosenberg
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Similarity in molecular data:
The study of evolution depends on 1) recognizing that organisms are similar, and 2) identifying whether the similarity is due to inheritance from a common ancestor. My lab examines computational methods for comparing DNA and protein sequences to better understand and reconstruct evolutionary history, relationships, and patterns. These methods include both comparisons among sequences (e.g., do the sequences represent the same gene in two different organisms) and within sequences (e.g., what pieces of the sequences should be compared to each other). The identified similarities and differences among these data can be used to study both how organisms are related to each other and how they have changed through time.

Similarity in space:
Recognizing and describing the spatial distribution of data is critical to understanding concepts in biology at all scales, ranging from intracellular systems to global ecology. My lab develops and examines methods and software for describing spatial patterns, particularly in biology, but also in a variety of other disciplines including diverse fields, such as; geography, geology, anthropology, mathematics, statistics, and computer science.

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