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Watercolors - Measuring the light field in natural waters. NICHOLAS TUFILLARO, dynamic penguin, llc. — Visible light is one the few wavelengths that has any significant transmissivity through natural waters: oceans, lakes, streams, and ponds. Light is a primary tool for investigating biological or physical processes in water from sensors in orbit, instruments on ships, or spectrometers in the water itself. I will focus on describing how to see — in vivo — the activities of phytoplankton in natural waters, both individual micro-swimmers (˜10 microns) up-to large assemblages of diatoms (˜10 km), and how these measurements are used to understand and gauge biological productivity at both the watershed and global scale. The talk will also discuss a few challenges in trying to do precision measurements in natural environments, instead of the our more natural habitat, the 'lab,' and some of the changes that are helpful to optical instrument designs, measurement procedures, and data analysis.

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