

Oceanography Seminar

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"Leveraging the Promise and Progress of Single Cell Activity Measurements in Marine Bacteria"

Continuing advances in fluorescence tagging, staining, and microscopy have enabled the efficient and sensitive measurement of cell-specific metabolism. Traditionally developed for and applied to biomedical model systems, these tools are well suited for microbial ecological investigation and expand upon aquatic microbiology research traditions established over 70 years ago. I will present and discuss approaches using click chemistry and enzyme linked fluorescence to monitor ranges of protein synthesis and phosphatase activity within individual bacteria comprising natural marine populations. Such approaches were crucial in revealing significantly higher proportions of active bacteria than previously thought, and instrumental in elucidating the role of particulate matter in modulating phosphorus cycling dynamics in the deep North Pacific Ocean. Like their heterogeneously dispersed microscale habitats, the activity spectrum of marine bacteria exists as a continuum that does not adhere to traditional Gaussian/normal distributions. These insights are important in considering the influence of single bacteria and/or sub-populations on community composition trajectories and in predicting growth and substrate processing responses to both cell-cell and cell-particle interactions.

Thursday October 2, 2014 3:00 p.m. MSB 100