

# OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Tuesday, October 9

Oral Session 5

16:20–17:40

17:00–17:20

## **OPTICAL INVERSIONS USING GLIDERS: METHOD DEVELOPMENT, VALIDATION AND APPLICATION WITHIN THE GULF OF MAINE**

Autonomous underwater gliders have enabled the full water column to be studied at high spatial detail, but only a few studies currently exploit the potential of bio-optical gliders, equipped with both radiometric and backscattering sensors, as a unique platform for developing and evaluating inversion methods. We have used Slocum gliders since 2008 to compliment the ongoing Gulf of Maine North Atlantic Time Series (GNATS), which has been sampling biological, chemical and optical properties in surface waters of the Gulf of Maine since 1998. The gliders are equipped with instruments for measuring spectral upwelling radiance, spectral downwelling irradiance, chlorophyll-a fluorescence, CDOM fluorescence and particulate backscattering. In this study, we present a novel method for the quality control and classification of glider-acquired radiometric profiles, and demonstrate how they can be used to estimate inherent optical properties (IOPs). For 3418 profiles measured within 3 hours of local apparent noon, we found the backscattering coefficient could be estimated with a median absolute error of 1.15 (i.e. 15% variability between the measured and estimated value) and a bias of 2%. Glider-measured apparent optical properties (AOPs) allow us to estimate IOPs which in turn can be used to estimate biogeochemical properties. Ultimately, this allows highly reliable studies of both the temporal and spatial distribution of phytoplankton populations and other optically significant materials (OSMs), and the impact of OSMs on light availability for phytoplankton growth throughout the euphotic zone across the Gulf of Maine.

**Catherine Mitchell**, Bigelow Laboratory for Ocean Sciences, [cmitchell@bigelow.org](mailto:cmitchell@bigelow.org), <https://orcid.org/0000-0001-9932-3050>

Bruce Bowler, Bigelow Laboratory for Ocean Sciences, [bbowler@bigelow.org](mailto:bbowler@bigelow.org)

David Drapeau, Bigelow Laboratory for Ocean Sciences, [ddrapeau@bigelow.org](mailto:ddrapeau@bigelow.org)

Howard Gordon, University of Miami, [hgordon@miami.edu](mailto:hgordon@miami.edu)

William Balch, Bigelow Laboratory for Ocean Sciences, [bbalch@bigelow.org](mailto:bbalch@bigelow.org)