Abstract: This presentation will summarize several case studies of changes in littoral ecosystems on the Northern Gulf of Mexico and Southeastern Atlantic coasts, as captured with satellite and airborne imagery analysis. On the Georgia coast, 35 years of Landsat imagery revealed large-scale (3 fold) inter-annual variation and a cumulative net loss of 16.5% in the aboveground biomass of the keystone salt marsh species, *Spartina alterniflora*. Spatial differences and temporal changes in 620 km$^2$ (about 680,000 pixels of *Spartina* habitat) were linked to climate variables, river hydrology, and sea level dynamics. In the same area, riparian brackish and freshwater wetlands are sensitive indicators of changes in salinity patterns. On the Texas coast, Black Mangrove vegetation is replacing salt marsh communities, as shown in analysis of high resolution WorldView satellite imagery. This “tropicalization” is well underway, but also reveals instabilities due to occasional winter incursions of arctic air. Finally, at multiple sites, we’ve used airborne hyperspectral and HICO Space Station imagery to document patterns of phytoplankton chlorophyll (including HABs) and CDOM in estuarine, inshore, and shelf waters.

We undertook a large-scale, 35 year analysis of 412.8 km$^2$ (480,000 pixels) of *Spartina* marshes in coastal Georgia (USA) based on new Hladik wetland mapping to produce 264 biomass maps (March, 1984 and April, 2018).

Methods: We subdivided areas common to our Landat scenes to USGS coastal hydrology (HUC) drainagetidal exchange systems. *Spartina* biomass algorithms was applied to each Sporine pixel (*O’Donnell & Schalles, 2016)*. We then extracted the biomass pixels from each HUC drainage.

- Tropical Black Mangrove Trees (Avicennia germánina) are rapidly expanding their range into the Coastal bend Region of Texas.
- We worked with the staff of the Mission-Aransas National Estuarine Research Reserve to survey vegetation in Aransas Bay, with recent attention focused on Mud Island, where mangroves have invaded in the last 2 decades and rapidly displaced existing salt marsh communities.
- Black foreshore in early 2011 and 2017 damaged mangroves (a sign of climate instability?).

CO photoproduction was vertically integrated to help elucidate the mechanisms regulating UV-driven photoproduction rates in the dynamic coastal environment of inshore and South Atlantic Bight waters of Central Georgia, USA. This work showed blended two ocean color algorithms to assess a UV dependent processes at high spatial resolution in an optically complex coastal environment.

From Can, Mishra, Schalles, & Miller. Blending two ocean color algorithms to evaluate ultraviolet (UV) optics and photochemistry using the Hyperspectral Imager for the Coastal Ocean (HICO). Geophys Res Lett [In Revision].