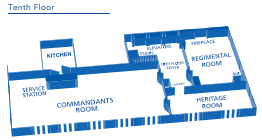

ADVANCES IN HYPERSPECTRAL REMOTE SENSING SCIENCE

Co-Chairs: Part I - Kevin Turpie (UMBC GSFC), Cecile Rousseaux (USRA GSFC); Part II - Maria Tzortiou (CUNY), Emmanuel Boss (Univ of Maine); Part III - Michelle Gierach (NASA JPL), Sherry Palacios (BAERI ARC)

Part I: Hyperspectral Remote Sensing Technology for Aquatic Environments
Hyperspectral remote sensing is greatly anticipated to transform marine, coastal, estuarine, and inland aquatic research and applications – accelerating efforts to understand and monitor synoptic and global response to climate change in aquatic ecology, biogeochemical cycling, and water quality. In situ and airborne instruments are already being deployed, including imaging and non-imaging sensors. Airborne hyperspectral imagers are providing valuable, high spatial resolution maps of physical processes and ecosystem structure. Concept spaceborne instruments, such as the Hyperspectral Imager for the Coastal Ocean (HICO), have provided a glimpse of the next generation spaceborne hyperspectral imagers that will scan the global ocean or closely monitor our coasts from geosynchronous orbit. Still, much of the operational infrastructure to support future spaceborne instruments is still being developed and multiple teams are striving to develop algorithms and computational resources for these missions. We will look at the progress and challenges common to all hyperspectral remote sensing supporting aquatic science and applications. Updates will be presented on the development of hyperspectral algorithms, including advances in atmospheric correction and retrieval of inherent optical properties from hyperspectral radiometry. We will also explore available data that is necessary to support future algorithm development.

Part II: Hyperspectral Science and Applications for Shelf and Open Ocean Processes
Hyperspectral remote sensing offers the research and applications communities an unprecedented opportunity to observe changes in pelagic and neritic ecology, marine biodiversity, biological processes, and biogeochemical cycling. Multispectral ocean colour data have provided a vast increase in knowledge of the oceans and their dynamics over the last two decades. With upcoming missions such as PACE, there is a need to assess applications that can be achieved through the hyperspectral remote sensing of ocean colour as well as its challenges. There is much anticipation that these missions will have a variety of applications, including the observation of the ecological response to climate change, changes in water quality, and processes affecting the oceanic carbon cycle. In this session, we will focus on how hyperspectral data can improve oceanic phytoplankton ecology and biogeochemistry research. To that end, we will look at approaches and results using various airborne and satellite sensors, including AVIRIS and HICO respectively, and explore work towards future missions (e.g. PACE, HyspIRI, and GeoCAPE).

Part III: Hyperspectral Studies of Coastal and Inland Waters
The objective of this session is to address science-driven questions for coastal and inland waters and provide a venue for how the research and applications community may identify and guide the development of remote sensing resources (in situ, airborne, and satellite) to facilitate the science. Recent advances will be presented on the subjects of biodiversity, habitat ecology, water quality, harmful algal blooms, and human health and safety. The focus of this session will be on the use of spaceborne, airborne, and in situ hyperspectral resources to understand near-coast, littoral, estuarine, and lacustrine environments, where high spatial and high spectral resolution imagery is needed to understand the mechanisms driving these systems and where problems inherent to atmospheric correction of optically complex waters are particularly acute. This session will showcase recent scientific advances in these environments using hyperspectral imagery.

Part I: ***Hyperspectral Remote Sensing Technology for Aquatic Environments***

08:45-08:50 **Introduction and overview**
Cecile Rousseaux (USRA, NASA GSFC)

08:50-09:10 **Hyperspectral atmospheric correction**
Bo-Cai Gao (Naval Research Lab)

09:10-09:30 **IOP and derived products from hyperspectral measurements.**
Steve Ackleson (Naval Research Lab)

09:30-09:45 **Hyperspectral datasets for algorithm development**
Kevin Turpie (UMBC)

Part II: ***Hyperspectral Science and Applications for Shelf and Open Ocean Processes***

09:45-10:05 **Hyperspectral ocean colour imagery and applications to studies of phytoplankton ecology**
Astrid Bracher (Alfred Wegener Institute)

10:05-10:25 **Hyperspectral remote sensing and applications to studies of the oceanic carbon pump**
David Siegel (UCSB)

10:25-10:45 **Benefits and challenges of applying hyperspectral ocean colour imagery to monitor and understand ecological global and synoptic response to climate change**
Mike Behrenfeld (Oregon State U.)

10:45-11:00 **Coffee Break**

Part III: ***Hyperspectral Studies of Coastal and Inland Waters***

11:00-11:20 **Hyperspectral remote sensing and application to phytoplankton biodiversity**
Stewart Bernard (CSIR)

11:20-11:40 **Coral reef colour: Remote and in-situ hyperspectral sensing of reef structure and function**
Eric Hochberg (BIOS)

11:40-12:00 **Remote sensing of water quality: Can hyperspectral imagery improve public health?**
Clarissa Anderson (UCSC)