# Ocean Optics XXIII

**PROGRAM BOOKLET**



Coccolithophores light up the Strait of Georgia. OLI - Landsat 8, August 19, 2016, by Norman Kuring, NASA GSFC

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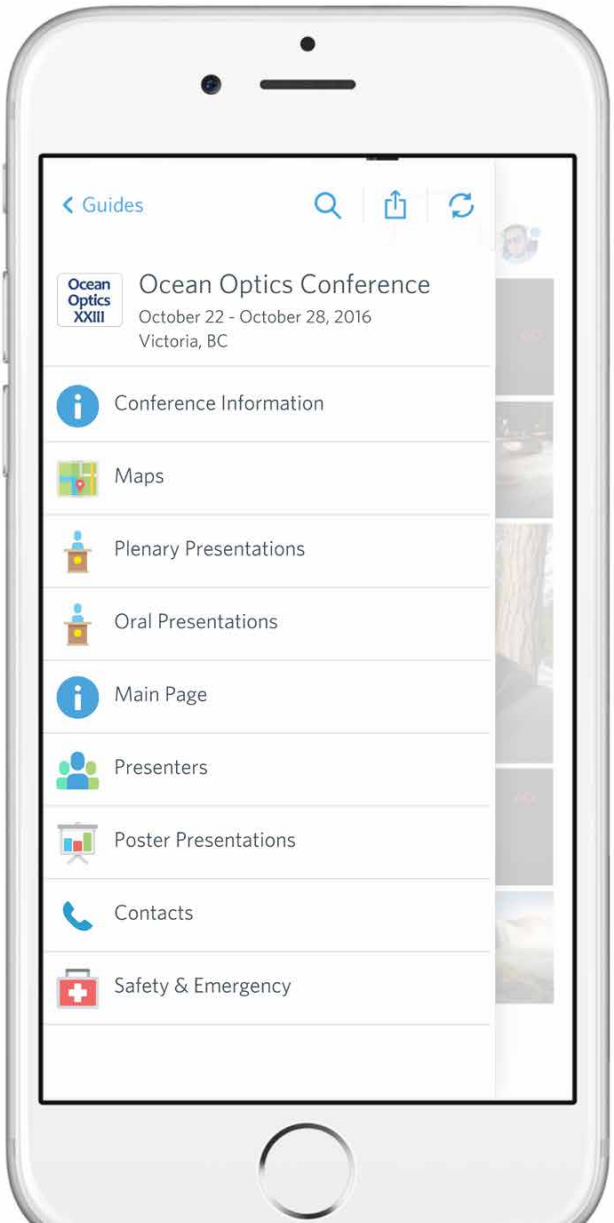


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Access all conference related information and content from your mobile device, including all of the short and extended abstracts.

The conference guidebook is also accessible via web browser* at:
**http://guidebook.com/guide/51764**

*Please note, not all functionality is available via web browser option.

# SCHEDULE AT A GLANCE

## SUNDAY 10/23

| | |
|---|---|
| 9:00 am – 5:00 pm | Workshops, Short Courses, and Meetings |
| 2:00 pm –7:30 pm | Registration – Victoria Conference Centre (VCC) Lobby |
| 5:30 pm – 7:30 pm | Icebreaker Reception – VCC Lobby |

## MONDAY 10/24

| | |
|---|---|
| 7:30 am – 5:30 pm | Registration and Help Desk – VCC Lobby |
| 9:00 am – 9:30 am | Welcoming Remarks |
| 9:30 am – 10:10 am | Plenary 1 |
| 10:10 am – 10:40 am | Break – VCC Carson Hall |
| 10:40 am – 12:00 pm | Oral Session 1 |
| 12:00 pm – 1:30 pm | Lunch – On your own |
| 1:30 pm – 2:50 pm | Oral Session 2 |
| 2:50 pm – 3:30 pm | Break – VCC Carson Hall |
| 3:30 pm – 4:50 pm | Oral Session 3 |
| 5:00 pm – 7:00 pm | Poster Session 1 – VCC Carson Hall |
| 7:15 pm – 8:15 pm | Town Hall » GEO AquaWatch – VCC Theatre |

LOCATIONS
All activities are in the VCC Theatre unless otherwise noted.

## TUESDAY 10/25

| | |
|---|---|
| 7:30 am – 5:30 pm | Registration and Help Desk – VCC Lobby |
| 8:00 am – 9:20 am | Oral Session 4 |
| 9:20 am – 10:00 am | Plenary 2 |
| 10:00 am – 10:30 am | Break – VCC Carson Hall |
| 10:30 am – 12:10 pm | Oral Session 5 |
| 12:10 pm – 1:30 pm | Lunch – On your own |
| 1:30 pm – 3:10 pm | Oral Session 6 |
| 3:10 pm – 5:00 pm | Poster Session 2 – VCC Carson Hall |
| 5:00 pm – 7:00 pm | Town Hall » Status Updates on Ocean Color Satellite Instruments and Missions – VCC Theatre |

## WEDNESDAY 10/26

| | |
|---|---|
| 7:30 am – 5:30 pm | Registration and Help Desk – VCC Lobby |
| 8:00 am – 9:20 am | Oral Session 7 |
| 9:20 am – 10:00 am | Plenary 3 |
| 10:00 am – 10:30 am | Break – VCC Carson Hall |
| 10:30 am – 12:10 pm | Oral Session 8 |
| 12:10 pm – 1:30 pm | Lunch – On your own |
| 1:30 pm – 3:10 pm | Oral Session 9 |
| 3:10 pm – 3:30 pm | Break – VCC Carson Hall |
| 3:30 pm – 4:30 pm | Oral Session 10 |
| 4:30 pm – 6:30 pm | Poster Session 3 – VCC Carson Hall |
| 6:30 pm – 7:45 pm | Town Halls<br>» Satellite Phytoplankton Functional Type Algorithm Intercomparison – VCC Sidney<br>» Benefits and Challenges of Geostationary Ocean Colour Remote Sensing: Science and Applications – VCC Theatre |

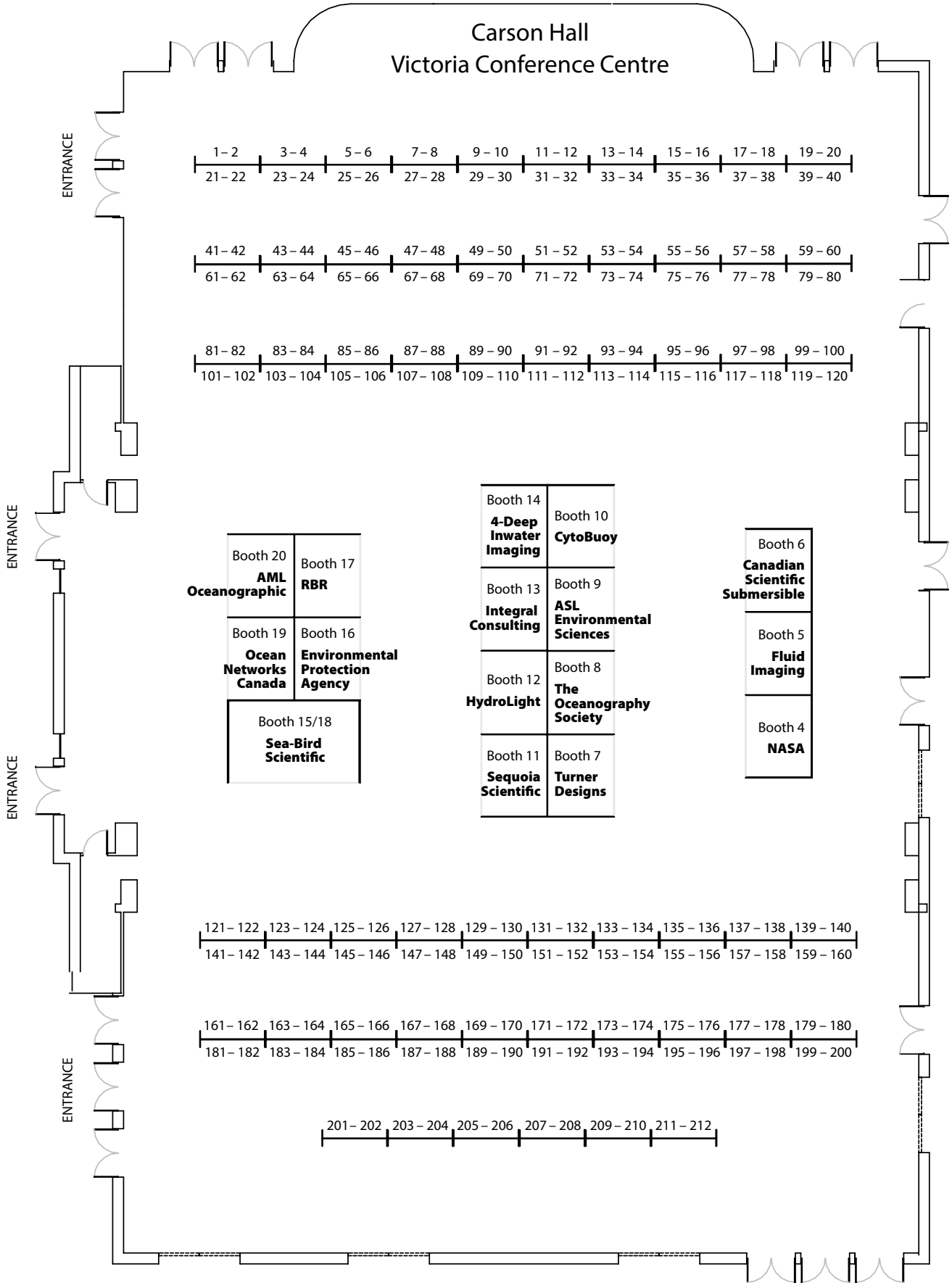
## THURSDAY 10/27

| | |
|---|---|
| 7:30 am – 5:30 pm | Registration and Help Desk – VCC Lobby |
| 8:00 am – 9:20 am | Oral Session 11 |
| 9:20 am – 10:00 am | Plenary 4 |
| 10:00 am – 10:30 am | Break – VCC Carson Hall |
| 10:30 am – 12:10 pm | Oral Session 12 |
| 12:10 pm – 1:30 pm | Lunch – On your own |
| 1:30 pm – 3:10 pm | Oral Session 13 |
| 3:15 pm – 4:30 pm | Town Halls<br>» Arctic COLORS – VCC Sidney<br>» HyspIRI and Future Hyperspectral Coastal and Inland Water Remote Sensing – VCC Theatre |
| 4:45 pm – 6:00 pm | Town Halls<br>» Priorities of Ocean Optics Research in a Changing Arctic – VCC Sidney<br>» Sentinel-3 Update – VCC Theatre |
| 7:00 pm – 12:00 am | Awards Banquet – VCC Carson Hall |

## FRIDAY 10/28

| | |
|---|---|
| 7:30 am – 1:00 pm | Registration and Help Desk – VCC Lobby |
| 9:30 am – 10:10 am | Plenary 5 |
| 10:10 am – 11:50 am | Oral Session 14 |
| 11:50 am – 12:15 pm | Closing Remarks |

# EXHIBIT AND POSTER HALL



# SPONSORS AND EXHIBITORS

## 4Deep

**Booth 14 — 4-deep.com**

4Deep inwater imaging is a global provider of submersible digital in-line holographic microscopes for real time, in-situ studies in virtually any liquid. On display will be our latest version (model S6) in conjunction with software programs for image analysis, automatic characterization and particle counting. 4Deep will also be displaying and giving an oral presentation related to our latest product: a submersible fluorescence microscope. This product is a first of its kind to detect harmful algae in very small concentrations as an early detection device. It combines fluorescence signaling with image analysis to provide a unique algae "fingerprint".

## AML Oceanographic

**Booth 20 — www.amloceanographic.com**

AML Oceanographic, headquartered in British Columbia, Canada, is a leading manufacturer of SVPs, CTDs, and other instrumentation for hydrographic surveying, environmental monitoring, and more. AML pioneered the design of field-swappable Xchange™ sensors, which minimize downtime and maximize the utility of each X•Series instrument. More recent innovations include Base•$X_2$, which brings Wi-Fi and GPS to profiling, enabling automatic data transfer and processing. With new CT•Xchange, Base•$X_2$ converts from SVP to CTD with the swap of a single sensor head, and Minos•X is the smallest combined CTD/SVP on the market. UV•Xchange and Cabled UV, the industry's only proven UV biofouling control products, ensure multiparameter sondes and other devices maintain performance throughout long term in situ deployments. Our tagline - Xchange your old ideas - brings to life our commitment to generate fresh, innovative ideas for the oceanographic community.

## ASL Environmental Sciences

**Booth 9 — www.aslenv.com**

ASL Environmental Sciences is a world-class company with 40 years' experience in oceanographic, acoustic, ice, and remote sensing research services. We provide clients with scientific consulting services including: Remote Sensing, Water Flow Measurement, Numerical Modeling, Wave Measurement & Analysis, Sediment Transport, and Ice Studies. Our remote sensing group has been performing water quality assessment since the early 1980s using a series of airborne and spaceborne data sources. These include studies of chlorophyll, temperature and turbidity along the BC coast, in the Great Lakes and Chilko Lake, BC, in the Gulf of Mexico, and near Kitimat, BC. Currently, we are using satellite-derived turbidity products in support of engineering studies for LNG port developments in coastal BC. Our long experience with water quality mapping has enabled us to serve in an advisory role on user needs and applications of remote sensing in freshwater and marine environments to groups such as the Canadian Space Agency (CSA), and Fisheries and Oceans Canada (DFO).

We also produce acoustic instrumentation for scientific research. ASL's line of products includes the Ice Profiler, Wave Profiler, Acoustic Zooplankton Fish Profiler, and the WERA NorthernRadar. Clients include oil and gas, universities, research institutes, government agencies, mining, aquaculture, ports, and harbours.

## Canadian Scientific Submersible Facility

**Booth 6 — www.ropos.com**

The Canadian Scientific Submersible Facility operates the Remotely Operated Platform for Ocean Sciences (ROPOS). ROPOS is known as the world's most capable scientific submersible for its versatility, efficiency, and operators; from deep-sea hydrothermal vent exploration to the deployment and maintenance of ocean observatories. ROPOS has 30 years of global collaboration with thousands of ocean scientists, engineers, and students. Please drop by, and learn how these such capabilities could compliment optical oceanography methods in addressing ocean science questions. Please contact Douglas Bancroft (bancroft@ropos.com) to obtain further information.

## CytoBuoy

**Booth 10 — www.cytobuoy.com**

The CytoBuoy flow cytometers and platforms are specially designed for ocean optics research. Our portable instruments enable the *in situ* detection, counting, optical characterization and discrimination of several thousands of individual living and abiotic particles per second. All this is achieved within a uniquely wide particle size range of 100 nanometers to over a millimeter. The quantitative analysis of different algal species is additionally supported by high-quality imaging. The remote control and minimized maintenance of our instruments make them suitable both for lab, mobile and field applications (submerged to 200 m depth or moored with our multisensor data buoy). With more than 25 years experience in flow cytometry and individual approach to our customers we assure reliable service tailored to your needs. We cordially invite you to visit our booth 10!

## Environmental Protection Agency

**Booth 16 — www.epa.gov/water-research**

The U.S. Environmental Protection Agency (EPA) Office of Research and Development's Safe and Sustainable Water Resources program provides scientific results and innovative technologies that are needed to protect chemical, physical, and biological integrity of the Nation's waters and to ensure safe drinking water and water systems. Agency scientists and engineers and their partners are addressing water resources challenges by integrating research on environmental, economic and social factors to provide lasting sustainable solutions.

## European Space Agency

**www.esa.int**

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world.

ESA is an international organisation with 22 Member States. By coordinating the financial and intellectual resources of its members, it can undertake programmes and activities far beyond the scope of any single European country.

## Fluid Imaging Technologies

**Booth 5 — www.fluidimaging.com**

The FlowCam® is a continuous imaging flow cytometer and particle analyzer designed for conducting research and monitoring of microorganisms and particles in both marine and freshwater systems. A laser interacts with a high resolution digital camera to capture images and data of a passing particle or organism. The instrument has two channels for the detection of fluorescence. By providing high resolution digital images of discrete particles, the FlowCam can provide cell counts, size data, including length, width, area, various diameter readings, as well as bio volume measurements, along with up to 32 additional image parameters of imaged particles. The FlowCam has proprietary software that includes a pattern recognition algorithm allowing the user to 'train' the instrument to identify organisms of interest. This also provides for the capability to automatically classify organisms in samples based on image analysis. FlowCam aquatic research applications include community structure determination, HAB monitoring, shipboard continuous sampling, invasive species, monitoring, ballast water research, and more .

The FlowCam was developed at Bigelow Laboratories for Ocean Science. Since its introduction in 1999, over 300 instruments have been installed in over 50 countries for aquatic research and monitoring.

## Gordon and Betty Moore Foundation

**www.moore.org**

Gordon and Betty Moore established the foundation to create positive outcomes for future generations. In pursuit of that vision, we foster path-breaking scientific discovery, environmental conservation, patient care improvements and preservation of the special character of the San Francisco Bay Area.

## HydroLight

**Booth 12 — www.sequoiasci.com/product/hydrolight**

Stop by the HydroLight booth to celebrate the 30th anniversary of the first HydroLight run and HydroLight's 18th anniversary as a commercial product. Learn what is coming in the near future (hint: totally rewritten code with Windows, Linux, and Apple versions). Tell war stories about your applications of HydroLight and suggest new features. Contact Curtis Mobley (curtis.mobley@sequoiasci.com) for further information.

## Integral Consulting Inc.

**Booth 13 — www.integral-corp.com**

Integral Consulting Inc. (Integral) provides environmental, oceanographic, and coastal engineering solutions for worldwide environments ranging from alpine lakes to the deep ocean. With services spanning water quality assessment and monitoring, geophysical surveying, and oceanography, Integral offers an array of innovative tools and approaches to support projects in all aquatic areas including SPI (Sediment Profile Imaging) and SEDFlume (Sediment Erosion with Depth Flume) for assessing features of the sediment bed. Additionally, with support from the Advanced Research Projects Agency - Energy, Integral, in partnership with Spoondrift Technologies, Inc. and Sandia National Laboratories, has developed WaveSpotter, a low-cost, lightweight, solar-powered surface tracking wave buoy, which can provide real-time, high-fidelity wave measurements throughout the world's oceans. Future development efforts will allow for integration of water quality, optical, and acoustical sensors on the WaveSpotter buoy platform.

## NASA

**Booth 4 — www.nasa.gov**

The National Aeronautics and Space Administration (NASA) is an independent agency of the executive branch of the United States federal government responsible for the civilian space program as well as aeronautics and aerospace research. NASA's vision: We reach for new heights and reveal the unknown for the benefit of humankind. To do that, thousands of people have been working around the world—and off of it—for more than 50 years, trying to answer some basic questions. What's out there in space? How do we get there? What will we find? What can we learn there, or learn just by trying to get there, that will make life better here on Earth?

## Ocean Networks Canada

**Booth 19 — www.oceannetworks.ca**

Established in 2007 as a major initiative of the University of Victoria, Ocean Networks Canada operates world-leading ocean observatories for the advancement of science and the benefit of Canada. The observatories collect data on physical, chemical, biological, and geological aspects of the ocean over long time periods, supporting research on complex Earth processes in ways not previously possible.

The observatories provide unique scientific and technical capabilities that permit researchers to operate instruments remotely and receive data at their home laboratories anywhere on the globe in realtime. These facilities extend and complement other research platforms and programs, whether currently operating or planned for future deployment.

## RBR

**Booth 17 — rbr-global.com**

RBR has been designing and manufacturing high precision instruments for oceanographic research here since 1976. Founded by a British electronics engineer, Richard Brancker, the company is now run by a team of enthusiastic engineers and oceanographers and produces instruments calibrated to WOCE standards.

RBR invests considerable effort into research and development, which is carried out in collaboration with customers to ensure that the instruments produced are precisely what the customer wants and can afford. RBR is a global leader in oceanographic instrumentation, providing competitive and innovative products to scientists worldwide.

## Sea-Bird Scientific

**Booth 15/18 — sea-birdscientific.com**

Sea-Bird Scientific combines the capabilities of Sea-Bird Electronics, WET Labs, and Satlantic to provide best-of-class sensors and systems for oceanographic research and environmental water quality monitoring of physical and biogeochemical properties. Today, Sea-Bird Scientific employs over 200 people in the U.S., Canada, Europe, China, and India in the development, manufacture, calibration, sales, and support of our products.

Visit us at Booth 15 to learn more about our Environmental Characterization Optics (ECO) sensor suite, Radiometers, pH sensors, and Profiling Float with Bio-Geochemical and Bio-Optical sensor systems. Our team of Scientists, Product Managers, Sales and Engineering will be present to answer your questions.

## Sequoia Scientific

**Booth 11 — www.sequoiasci.com**

Sequoia Scientific manufactures laser diffraction and holographic particle size analyzers. Our LISST instruments are used from the deep sea to your lab bench to measure particles from sub-micron to several millimeters. The LISST-200X (a new version of the LISST-100X) and LISST-Deep are also widely used in ocean optics for measuring forward-angle volume scattering function (VSF) and beam attenuation to depths of 3500 meters. The LISST-Holo is the first commercially available submersible digital holographic particle imaging system. Our latest addition, LISST-VSF, measures VSF from 0.01 to 150 degrees, and the degree of linear polarization from 15-150 degrees. Stop by Booth 11 to learn more.

## The Oceanography Society

**Booth 8 — tos.org**

The Oceanography Society (TOS) was founded in 1988 to disseminate knowledge of oceanography and its application through research and education, to promote communication among oceanographers, and to provide a constituency for consensus-building across all the disciplines of the field.

As a professional society, The Oceanography Society is committed to supporting a community that encourages the open expression and exchange of ideas, that is free from all forms of discrimination, harassment, and retaliation, and that is welcoming to all members and to those who participate in its activities. In pursuit of that commitment, TOS is dedicated to the philosophy of equality of opportunity and treatment for all participants.

## Turner Designs

**Booth 7 — www.turnerdesigns.com**

Turner Designs is exhibiting several new innovative products for estimating algae or algal groups using *in vivo* fluorescence detection and an instrument that uses an advanced method to measure *in situ* absorption resulting in more accurate absorption estimates. AquaFlash is a handheld fluorometer used for estimating photosynthetic efficiency and abundance of phytoplankton using fluorescence detection. Ballast-Check 2 is a similar handheld instrument optimized for quick indicative compliance checks of ships' ballast water. CyanoFluor is a handheld fluorometer equipped with optics for detecting chlorophyll and phycocyanin responses from natural water samples to easily identify potential HAB conditions. PhytoFind is an *in situ* algal classification tool that distinguishes among algal groups and provides percentage estimates in real time. ICAM, an *in situ* Integrating Cavity Absorption Meter, is factory configured with nine (9) wavelengths from UV (365nm) to Red (676nm) enabling absorption measurement over a wide spectrum with little or no effect from scattering particles.

# SCHEDULE HIGHLIGHTS

## Registration and Help Desk

The registration and help desk in the lobby of the Victoria Conference Center (VCC) will be open on:

» Sunday: 2:00 pm – 7:30 pm
» Monday – Thursday: 7:30 am – 5:30 pm
» Friday: 7:30 am – 1:00 pm

## Icebreaker Reception

Sunday, October 23, 5:30 pm – 7:30 pm, VCC Lobby

All conference attendees and guests are invited to the opening "icebreaker" reception scheduled for Sunday evening, October 23. Pick up your complimentary drink ticket when you pick up your badge.

## Oral Presentations

At least one day before your presentation is scheduled to take place, all oral presenters should visit the "speaker ready" room (VCC Sooke, located on the same level as the VCC Theatre) to upload their presentation file to the main presentation computer system. Oral presentations will take place in the VCC Theatre.

## Refreshment Breaks

Morning and mid-afternoon refreshment breaks (coffee, soda, etc.) will be held in VCC Carson Hall. During poster sessions, complimentary sodas and waters will be available, and a cash bar will be open for beer and wine purchases.

## Job and Funding Announcements

A poster board where employment or other funding opportunities can be posted will be located in the VCC Carson Hall near Poster 200. Announcements are also available online at: https://tosmc.memberclicks.net/opportunities.

## Posters and Exhibits » VCC Carson Hall

### Poster and Exhibit Setup/Takedown

Access for exhibit and poster setup will be available:
» Sunday afternoon, October 23, 12:00 pm – 6:00 pm
» Monday morning, October 24, beginning at 8:00 am

Poster viewing and exhibits will close promptly at 1:30 pm on Thursday, October 27. All posters must be removed by 3:00 pm that day. Any remaining posters will be stored at the registration counter, but will be recycled if not collected by 1:00 pm on Friday.

### Poster and Exhibit Viewing Hours

VCC Carson Hall will officially open for poster and exhibit viewing at 10:00 am on Monday, October 24. Exhibitors will staff their booths during all breaks and poster sessions and at other times as noted in signs located in their booth area.

### Poster Sessions

**Poster Session 1**
Monday, October 24, 5:00 pm – 7:00 pm

**Poster Session 2**
Tuesday, October 25, 3:10 pm – 5:00 pm

**Poster Session 3**
Wednesday, October 26, 4:30 pm – 6:30 pm


## Best Speaker and Best Poster Awards

All attendees are able to cast their vote for the best oral presentation and the best conference poster. All presentations (except for invited plenary presentations) and posters are eligible to receive a vote. The winners of the Best Speaker Award and Best Poster Award will receive certificates, and their names will be announced to all conference attendees after the conclusion of the conference.

Please be sure to view posters during the Monday – Wednesday poster sessions. Ballots for both of these awards will be included in each attendee's registration badge holder. A collection box will be located at the registration desk, and all votes must be cast by Friday, October 28, at 1 pm.

# Awards Banquet

Thursday, October 27, 7:00 pm – 12:00 am, VCC Carson Hall

The highlight of the conference week is the awards banquet on Thursday night where conference attendees gather to honor the recipient of the Jerlov Award and the Best Student Paper recipient. Participation in the banquet is included in each attendee's registration fee, and guests may attend for an additional registration cost. After dinner is served, a performance by the Le La La Dancers will take place, followed by presentations of the Jerlov Award and Best Student Paper Award. The evening will conclude with dancing with live music provided by the Lost Boys, a local Victoria rock band.

## Performance by the Le La La Dancers

The Le-La-La Dancers are a traditional Kwakwaka'wakw (pronounced kwa kwa key wok) dance company who present First Nations culture of Northern Vancouver Island, located in British Columbia, Canada. The group has shared their culture by entertaining and educating throughout the world for over 25 years under the direction of George Me'las Taylor. Learn more at: http://lelaladancers.com.

## Best Student Paper Award

The OOXXII Planning Committee selects the winner of this award based on a review of extended abstracts. The winner of this award will receive a check for $500, a certificate, and will have their name added to the plaque recognizing previous recipients.

## Jerlov Award: Dr. Curtis Mobley

The Oceanography Society is pleased to announce that Dr. Curtis Mobley has been selected as the 2016 recipient of The Nils Gunnar Jerlov Award recognizing his contributions to the advancement of our knowledge of the nature and consequences of light in the ocean.

Dr. Mobley is an internationally renowned expert in applications of radiative transfer theory to problems in optical oceanography and ocean color remote sensing. Dr. Mobley received his Ph.D. in Meteorology from the University of Maryland in 1977, and he has been Vice President for Science and Senior Scientist at Sequoia Scientific, Inc. since 1996. He has over 65 refereed publications in optical oceanography on topics ranging from sea surface reflectance and transmission to ocean color remote sensing, inverse methods, ocean ecosystem modeling, bioluminescence and camouflage, bio-optics, and numerical techniques for radiative transfer calculations. Through the software he wrote and commercialized (HydroLight), he has democratized radiative-transfer calculations as a tool to be used for applications from instrument design, through realistic light fields for primary productivity estimates, to providing the lookup tables necessary to invert space-based observations to obtain in-water properties. In addition, Curt is highly regarded for the quality of his lectures, short courses, tutorials, and web pages, which have introduced many undergraduate and graduate students to the field. He has received scholarly recognition ranging from a Fulbright Fellowship to Germany as a graduate student to selection as the 2012 Distinguished Alumnus of the University of Maryland School of Atmospheric and Oceanic Sciences. The Oceanography Society proudly recognizes Dr. Mobley as the 2016 recipient of the Jerlov Award for his lifetime of achievements and contributions to optical oceanography.

**About the Award.** Nils Gunnar Jerlov was an early leader in the area of ocean optics research. His name is recognized widely within the entire international oceanographic research community. Jerlov's theoretical and experimental work on ocean optical and related processes helped form the foundation of modern ocean optical research. He proposed the concept of an optical ocean water mass classification and the Jerlov water types are familiar to many outside of the ocean optics community. His book, Marine Optics, published in 1976, remains widely referenced and is considered required reading for all students of ocean optics and ocean color remote sensing.

The Oceanography Society (TOS) commemorates Dr. Jerlov and his many contributions to the study of light in the ocean with an international award, established in his name, to recognize outstanding achievements in ocean optics and ocean color remote sensing research. For more information visit: www.tos.org/awards_honors/jerlov_award.html

# PLENARIES

PLENARY 1 » MONDAY 10/24, 9:30 – 10:10 AM

## Ménage à Trois: Work, Love, Life

**Patricia A. Matrai**, Bigelow Laboratory for Ocean Sciences

Is it possible to be an influential scientist while also having a great personal life off the bench/computer/ship? Can one love doing science? Love one's family and friends? And love whatever else floats his or her boat, whether it is music, sports, reading or simply being? Can this "ménage à trois" happen happily?

The answer is "Yes, well…maybe, and sometimes no." Should one feel shame or guilt because of the choices? No! We, as scientists, humans, and family members, need to learn simply to say so, make the choices, acknowledge the consequences, and by doing so live life fully. Why is this so darn hard to do? When the Ocean Optics XXIII Organizing Committee asked me to give this Plenary Talk, I ran away. Literally.

I questioned "who was I to tell other scientists what to do when it comes to work/life balance strategies?"

After some calmer thoughts, aided by a bit of wine, I realized that over the last two decades, I have learned a few tricks of the trade. I've tackled this work/life balance problem over and over again, just as one troubleshoots lab or field protocols. Daring greatly, with humor as my assistant, I will share with you some of the choices and compromises I have made; the players and tasks involved, and how at the end of the day, I have found balance, I found the formula (albeit always changing) to live and love life, without ditching any of its components.

PLENARY 2 » TUESDAY 10/25, 9:20 – 10:00 AM

## Building a Smart Ocean and Coasts

**Kathryn Moran**, Ocean Networks Canada

Ocean Networks Canada (ONC) represents an investment of over $278 million in ocean-observing technologies, and supports transformative, multi-disciplinary research in coastal and deep ocean environments whose applications shed light on ocean processes and their impacts on a global scale. ONC's vast data collection capacity has expanded to include an observatory in the Arctic Ocean, expanded systems along the west coast of Canada, community volunteer ship data collection systems, coastal radars, ferry-based observations, delivery of data from Canada's east coast, and autonomous systems. By continuously capturing, archiving, and delivering data from the ocean, these observatories support scientific study on climate change; life in the ocean; fluxes that cross the seafloor, water column, and the atmosphere; water and sediment exchanges from/to the deep sea and shallow seas; and seismicity, tsunamis, and underwater landslides.

ONC not only delivers this world-leading ocean observatory infrastructure, but is also Canada's provider of open big data for the ocean. ONC is agile, responsive, and maximizes concomitant economic and societal benefits through the delivery of its Smart Ocean Systems™ ocean analytics products that improve marine and public safety, and provide evidence-based coastal and ocean environmental data through the operation of observatories off Canada's west coast, in the Arctic, and at critical coastal locations along Canada's east and west coasts. Oceans 2.0, big data provider, is a unique digital infrastructure that manages vast amounts of complex data streams. It represents ocean big data because of the continuously increasing volume (currently at 450 terabytes), the variety of data types (hundreds of instrument types and over 5000 individual sensors), the data structures that enable rapid access and delivery of analytically-derived alerts, the consistency of data through an instrument management system with robust and rich metadata, as well as automatic and manual QA/QC. Oceans 2.0 delivers ocean instrument data openly and freely over the Internet to the international science community and, through Smart Ocean Systems™, analytic products to many more stakeholders. Oceans 2.0, recognized by the International Council for Science's World Data System, is flexible, scalable, and supports diverse end-user requirements spanning the wide range of ocean research disciplines, it provides industrial-level monitoring, and it informs emergency mitigation, preparedness, and response. ONC continuously enhances Oceans 2.0 with state-of-the-art tools and sophisticated technologies to improve, accelerate, and expand operational marine decision-making capabilities.

PLENARY 3 » WEDNESDAY 10/26, 9:20 – 10:00 AM

## Monitoring Water on a Global Scale with Google Earth Engine

**Tyler Erickson**, Google

Google Earth Engine is cloud-based platform for analyzing geospatial data, such as satellite remote sensing imagery, or Earth system model output, or digital elevation models. Through its Javascript and Python APIs, Earth Engine makes petabytes of Earth observation data accessible, and provides hundreds of algorithmic building blocks that can be chained together to produce high-level algorithms and outputs in real-time. https://earthengine.google.com. The Earth Engine platform was originally created to help scientists monitor deforestation on a global scale. However, the platform was designed as a general geospatial analysis platform, and algorithm developers have found it useful for a many Earth science domains. Many scientists have used the platform for analyzing aspects of the water cycle, and as a result water is one of the primary focus areas influencing the development of new Earth Engine functionality (datasets, algorithms, and tools). This talk will give an overview of the Earth Engine platform, it's history, capabilities, and future directions, with a focus on the water cycle analyses.

PLENARY 4 » THURSDAY 10/27, 9:20 – 10:00 AM

## The Ocean Colour Signal of Climate Change: A Numerical Model Study

**Stephanie Dutkiewicz**, Massachusetts Institute of Technology

Ocean biogeochemical and ecosystem models are beginning to include output that can be compared directly to ocean colour and optics products (e.g. absorption, scattering, remotely sensed reflectance). Such models can be used as tools to explore ocean colour products. In this talk we show how the MIT global model can be used explore the how ocean colour may alter over the 21st century as a result of anthropogenic driven global changes. The numerical model includes radiative transfer and optically important constituents such as detrital particles, coloured dissolved organic matter (CDOM), and an optically diverse phytoplankton community. The model output include reflectance similar to that captured by satellite sensors. Under a business as usual emissions scenario the model ocean warms, and alterations to stratification and circulation lead to regionally varying changes in the marine ecosystem. We find that even by 2100, only about 50% of the ocean shows a statistically significant trend in Chl-a concentrations; a consequence of strong natural variability. Phytoplankton community structure and the relative ratios of CDOM and detrital matter are also altered. Because there is a change in optical characteristics of the oceans, the blue/green reflectance ratio Chl-a product developed for today, is not able to match the actual trends in the Chl-a. On the other hand, we find that almost 75% of the ocean has a statistically significant trend in reflectance by 2100. This is because reflectance integrates the changes in all the optically important constituents.

Authors: Stephanie Dutkiewicz, Anna Hickman, Oliver Jahn, Erwan Moneir, Stephanie Henson, and Claudie Beaulieu

PLENARY 5 » FRIDAY 10/28, 9:30 – 10:10 AM

## Beyond Biogeochemistry: Monitoring the Physical Drivers of Shelf Sea Ecosystems Using Ocean Colour Radiometry

**Alex Cunningham**, University of Strathclyde

The pioneers of ocean colour radiometry envisaged a wide range of applications for this new source of oceanographic data, including studies of phytoplankton dynamics, water mass mixing, coastal erosion, sediment movement, river plume dynamics, and underwater visibility. In the three decades following the launch of the Coastal Zone Colour Scanner in1978, however, ocean colour research became increasingly focused on spatial and temporal variations in phytoplankton pigment concentrations and their implications for primary production and ocean/atmosphere gas exchange. Other applications were relatively neglected, and the distinctive radiometric signals observed in shelf seas and coastal regions were pigeon-holed as 'Case 2 problems' whose main significance was to complicate chlorophyll retrieval algorithms. More recently, a new approach to these problems has been stimulated by (i) the formulation of effective semi-analytical ocean colour algorithms capable of operating in optically complex waters, (ii) the availability of multi-year time series of satellite observations and (iii) the launch of new ocean colour sensors with increased spatial and spectral resolution. As a result, there is an emerging synergy between satellite observations and coupled physical/biological shelf sea models that enhances the analytical capability of both disciplines. Such a combined approach enables ocean colour radiometry not only to provide information on the status of shelf sea ecosystems, but also important insights into their response to physical processes. It also suggests that increased engagement with the marine physics and coastal ecosystem communities can provide a mechanism for advancing the socioeconomic relevance of ocean colour research.

# ORAL SESSIONS

## MONDAY 10/24

### ORAL SESSION 1

10:40 am – 11:00 am
**Ocean Remote Sensing with Spaceborne Lidar: Present and Future**
*TOPICS » Remote Sensing; Phytoplankton*
Chris A. Hostetler, Michael J. Behrenfeld, Yongxiang Hu, Johnathan W. Hair, Emmanuel S. Boss, David A. Siegel, Xiaomei Lu, Sharon D. Rodier, Kathleen A. Powell, Amy Jo Scarino, Carolyn F. Butler, Jennifer Schulien

11:00 am – 11:20 am
**Field test of a Brillouin LIDAR for the temperature profile measurement of the ocean**
*TOPICS » Remote Sensing*
Thomas Walther, David Rupp, Sonja Friman, Charles Trees, Georges Fournier

11:20 am – 11:40 am
**New method for retrieval of chlorophyll a fluorescence by using smart phones**
*TOPICS » Crowdsourcing and Participatory Science*
Anna Friedrichs, Julia A. Busch, Hendrik J. van der Woerd, Oliver Zielinski

11:40 am – 12:00 pm
**True colour analysis of natural waters with SeaWiFS, MODIS, MERIS and OLCI by SNAP**
*TOPICS » Crowdsourcing and Participatory Science; Observational Systems*
Hans van der Woerd, Marcel R. Wernand, Marco Peters, Muhammad Bala, Carsten Brockmann

### ORAL SESSION 2

01:30 pm – 01:50 pm
**Models to better understand the angular scattering of phytoplankton communities and the associated water colour signal**
*TOPICS » Radiative Transfer Modeling; Phytoplankton*
Stewart Bernard, Lisl Robertson-Lain, Mark W. Matthews

01:50 pm – 02:10 pm
**Optical closure between PSDs and IOPs in natural waters: a Mie-based flow cytometric method**
*TOPICS » Instrument Techniques; Sediments and Particles*
Jacopo Agagliate, David McKee, Rüdiger Röttgers, Michael S. Twardowski

02:10 pm – 02:30 pm
**Coherent Noise Modelling for Uncertainty Estimates of Remote Sensing Data**
*TOPICS » Radiative Transfer Modeling; Remote Sensing*
Daniel S. Marrable, Peter Fearns, Kathryn L. Barker, Mathew J. Wyatt

02:30 pm – 02:50 pm
**Why is the ocean not black?**
*TOPICS » Remote Sensing; Sediments and Particles*
Xiaodong Zhang, Deric J. Gray, Ping Yang

### ORAL SESSION 3

03:30 pm – 03:50 pm
**Design and development of a submersible fluorescence microscope for early detection of harmful algae blooms**
*TOPICS » Fluorescence; Underwater Imaging*
Sergey Missan, Manfred Jericho

03:50 pm – 04:10 pm
**Algorithm Comparisons for Retrieving Chlorophyll-a and Turbidity Parameters in Inland Lakes from Hyperspectral Imagery**
*TOPICS » Phytoplankton; Remote Sensing*
Min Xu, Hongxing Liu, Richard Beck, Larry Liu, John Lekki

04:10 pm – 04:30 pm
**Relationships and consistencies among particle size distribution, phytoplankton community structure, chlorophyll-a and the ocean color**
*TOPICS » Phytoplankton; Remote Sensing*
Takafumi Hirata, Nick Hardman-Mountford, Jim Aiken, Ray Barlow, Stewart Bernard, Yoshio Masuda, James Fishwick, Victor Martinez-Vicente, Robert Brewin, Yasuhiro Yamanaka

04:30 pm – 04:50 pm
**Multi-decadal chlorophyll patterns in the tropical Pacific linked to sub-surface circulation changes**
*PTOPICS » hytoplankton; Physical Forcing of Ocean Biology; Remote Sensing*
Stephanie S. Uz, Antonio J. Busalacchi, Michael N. Evans, Christopher W. Brown, Thomas M. Smith, Xiujun Wang

## ORAL SESSION 4

8:00 am – 8:20 am
**Quantifying the highest naturally-occurring concentrations of solar energy on Earth produced by focusing of sunlight by water surface waves**
*TOPICS » Light fields in the ocean*
Dariusz Stramski, Miroslaw Darecki

8:20 am – 8:40 am
**Characterization of oceanic light fields and apparent optical properties in the euphotic layer with an emphasis on distinctive features caused by inelastic radiative processes**
*TOPICS » Underwater light fields*
Linhai Li, Dariusz Stramski, Miroslaw Darecki

8:40 am – 9:00 am
**The vertical distribution and seasonality of light under Arctic Ocean sea ice**
*TOPICS » High Latitudes; Observational Systems*
Samuel Laney, John M. Toole, Richard A. Krishfield

9:00 am – 9:20 am
**On the Green Edge: Bio-optical Observations from the Marginal Ice Zone in Baffin Bay using Gliders, Floats and Ship profiles**
*TOPICS » High Latitudes; Phytoplankton*
Eric Rehm, Guislain Bécu, Clémence Goyens, Griet Neukermans, Xiaogang Xing, Marcel Babin

## ORAL SESSION 5

10:30 am – 10:50 am
**Physical and biological sources of optical backscattering in the Southern Ocean**
*TOPICS » High Latitude; Sediments and Particles*
Kaylan L. Randolph, Heidi M. Dierssen, Michael S. Twardowski, Xiaodong Zhang, William B. Balch, Veronica P. Lance

10:50 am – 11:10 am
**Spatiotemporal variability of satellite derived phytoplankton size structure and its impact on benthic infaunal distribution in the Pacific Arctic**
*TOPICS » High Latitudes; Phytoplankton*
Hisatomo Waga, Toru Hirawake, Amane Fujiwara, Jacqueline M. Grebmeier, Sei-Ichi Saitoh

11:10 am – 11:30 am
**Phytoplankton blooms in an atlantifying Barents Sea**
*TOPICS » High Latitudes; Phytoplankton*
Griet Neukermans, Laurent Oziel, Emmanuel Devred, Marcel Babin

11:30 am – 11:50 am
**Ocean color in a fully-coupled earth system model: how including colored detrital matter affects ocean heating, temperatures and sea ice extent**
*TOPICS » High Latitudes; Ecosystem Models*
Grace E. Kim, Anand Gnanadesikan, Marie-Aude Pradal

11:50 am – 12:10 pm
**Using optical measurements to investigate under-ice warming, primary production and photo-oxidation in the upper Arctic Ocean**
*TOPICS » High Latitudes; Observational Systems*
Victoria Hill, Bonnie Light, Mike Steele

## ORAL SESSION 6

01:30 pm – 01:50 pm
**Polarized Remote Sensing Reflectance Retrieval through Wind-Driven Oceans and Validation with in-situ Polarimetry**
*TOPICS » Radiative Transfer Modeling; Remote Sensing*
Robert Foster, Alex Gilerson, Amir Ibrahim, Carlos Carrizo, Ahmed El-Habashi, Wayne Slade, Mike Twardowski, Nicole Stockley, Deric Gray, Ivona Cetinic

01:50 pm – 02:10 pm
**Spectral reflectance measurements of whitecaps and foam in the near infrared reveals a potential new approach to estimate whitecap reflectance in visible wavelengths**
*TOPICS » Radiative Transfer Modeling; Remote Sensing*
Heidi M. Dierssen, Shungudzemwoyo Garaba, Kaylan Randolph, Bo-Cai Gao, Pengwang Zhai

02:10 pm – 02:30 pm
**Measuring the Absorption Coefficient of Pure Water from 250-550 nm**
*TOPICS » Radiative Transfer Modeling; Ocean Spectroscopy; Remote Sensing*
John D. Mason, Michael T. Cone, Edward S. Fry

02:30 pm – 02:50 pm
**Investigation of the relationship between algal fluorescence and the underwater degree of polarization: comparison of vector radiative transfer simulations and underwater field measurements of multangular hyperspectral polarization**
*TOPICS » Radiative Transfer Modeling; Underwater polarimetric retrievals; Fluorescence*
Ahmed El-habashi, Carlos Carrizo, Jacek Chowdhary, Robert Foster, Amir Ibrahim, Thomas Legbandt, Sam Ahmed

02:50 pm – 03:10 pm
**Inelastic Scattering In Vector Radiative Transfer**
*TOPICS » Radiative Transfer Modeling; Remote Sensing*
Pengwang Zhai, Yongxiang Hu, David M. Winker, Bryan A. Franz, Emmanuel Boss

## ORAL SESSION 7

8:00 am – 8:20 am
**A novel quality assurance system for spectral remote sensing reflectance: mechanism, performance, and applications**
*TOPICS » Remote Sensing*
Jianwei Wei, Zhongping Lee

8:20 am – 8:40 am
**Effect of wind-generated bubbles on MODIS/Aqua ocean color products in the Southern Oceans**
*TOPICS » Remote Sensing*
Qian Yang, Bingyi Liu, Zhongping Lee, Xiaoyan Liu, Ming-Xia He

8:40 am – 9:00 am
**Recent enhancements in atmospheric correction algorithm for ocean color retrievals from remotely sensed data**
*TOPICS » Remote Sensing; Radiative Transfer Modeling*
Ziauddin Ahmad, Bryan A. Franz

9:00 am – 9:20 am
**Coastal water extraction algorithm for Landsat-8 based on spectral analysis and the Hue-Saturation-Value based approach**
*TOPICS » Remote Sensing*
Dat Dinh Ngoc, Hubert Loisel

## ORAL SESSION 8

10:30 am – 10:50 am
**Optical tools for environmental monitoring**
*TOPICS » Environmental Management; Instrument Techniques*
Grace Chang, Craig Jones, Todd Martin, Frank Spada

10:50 am – 11:10 am
**Re-evaluating ocean warming impacts on global phytoplankton**
*TOPICS » Phytoplankton; Remote Sensing*
Michael J. Behrenfeld

11:10 am – 11:30 am
**Phytoplankton absorption explains patterns in primary productivity in Australian coastal shelf waters**
*TOPICS » Primary Productivity; Coastal Environment*
Charlotte M. Robinson, Nagur Cherukuru, Nick J. Hardman-Mountford, Jason D. Everett, M. James McLaughlin, Virginie van Dongen-Vogels, Peter J. Ralph, Martina A. Doblin

11:30 am – 11:50 am
**Spectral Reflectance of Palauan Corals with Different Symbiont Species, and Response to Elevated Temperature**
*TOPICS » Coral Reefs; Underwater Imaging*
Brandon Russell, Heidi M. Dierssen, Todd C. LaJeunesse, Kenneth D. Hoadley, Mark E. Warner, Dustin W. Kemp, Timothy G. Bateman

11:50 am – 12:10 pm
**Relation between phytoplankton chlorophyll and particulate organic carbon in the Indian Ocean**
*TOPICS » Phytoplankton*
Bozena Wojtasiewicz, Nick Hardman-Mountford, François Dufois, Jim Greenwood, Dirk Slawinski, David Antoine, Tom Trull

## ORAL SESSION 9

01:30 pm – 01:50 pm
**ACOLITE processing for Sentinel-2 and Landsat-8: atmospheric correction and aquatic applications**
*TOPICS » Remote Sensing*
Quinten Vanhellemont, Kevin Ruddick

01:50 pm – 02:10 pm
**Hyperspectral Mapping of Lake Erie HABs**
*TOPICS » Remote Sensing*
Richard H. Becker, Michael Cline

02:10 pm – 02:30 pm
**Spatial and spectral inter-comparison of CyanoHAB signatures in Lake Erie and Sandusky Bay using multi-spectral and hypersectral remote sensing instruments**
*TOPICS » Remote Sensing; Lacustrine Environments*
Joseph D. Ortiz, Dulcinea Avouris, Stephen Schiller, Jeffrey C. Luvall, John Lekki, George S. Bullerjahn, Robert M. McKay

02:30 pm – 02:50 pm
**Effect of stratified water column on chlorophyll estimate by remote sensing algorithms in a highly eutrophic hydroelectric reservoir**
*TOPICS » Inland Waters; Remote Sensing*
Claudio C. Barbosa, ZhongPing Lee, Lino Sander de Carvalho, Evlyn M.L.M. Novo

02:50 pm – 03:10 pm
**Large invasion of floating aquatic plants in the Rao de la Plata estuary!**
*TOPICS » Remote Sensing; Coastal Environment*
Ana I. Dogliotti, Juan I. Gossn, Q. Vanhellemont, Kevin G. Ruddick

## ORAL SESSION 10

03:30 pm – 03:50 pm
**Parameterized model of bidirectional effects in ocean color remote sensing**
*TOPICS » Remote Sensing*
Shuangyan He, Xiaodong Zhang, Yuanheng Xiong

03:50 pm – 04:10 pm
**Filter pad and PSICAM particulate absorption: more than just the sum of the parts**
*TOPICS » Instrument Techniques; Phytoplankton*
Ina Lefering, David McKee, Rüdiger Röttgers, Christian Utschig, Kerstin Heymann

04:10 pm – 04:30 pm
**Mapping and surveillance of benthic habitats with UHI**
*TOPICS » Underwater Imaging; Seafloor and Benthic Properties/Processes*
Ragnhild Pettersen, Lars Martin Sandvik Aas, Hector Andrada, Carl Ballantine, Jørgen Berge, Jenny Bytingsvik, Lionel Camus, Ingvar Eide, Stefan Ekehaug, Perrine Geraudie, Julien Guyomarch, Ingrid Myrnes Hansen, Geir Johnsen, Stephane LeFloch, Luca Tassara, Frank Beuchel

# THURSDAY 10/27

## ORAL SESSION 11

8:00 am – 8:20 am
**A multi-instrument approach to determining spectral variability of the volume scattering function**
*TOPICS » Instrument Techniques*
Nicole Stockley, Michael Twardowski, James Sullivan, Deric Gray, Alan Weidemann, David McKee

8:20 am – 8:40 am
**Hyperspectral radiometric device for accurate measurements of water leaving radiance from autonomous platforms for satellite vicarious calibrations**
*TOPICS » Remote Sensing; Instrument Techniques*
Andrew H. Barnard, Ronnie Van Dommelen, Emmanuel Boss, Keith Brown, Marlon Lewis, Burkhard Plache, Joel Reiter, Daryl Carlson, Jamie Hutchins, Steve Adams, Jim Hochstein, Scott Feener, Alex Derr, Dave Walter

8:40 am – 9:00 am
**Exploiting In Situ Lidar To Retrieve Optical Characteristics and Particle Distributions Of The Upper Ocean**
*TOPICS » Instrument Techniques; Observational Systems*
Richard C. Zimmerman, Brian Collister, Charles I. Sukenik, Victoria J. Hill, William M. Balch

9:00 am – 9:20 am
**Collecting and processing underway in-line optical data**
*TOPICS » Instrument Techniques; Observational Systems*
Emmanuel S. Boss, Barney Balch, Bruce Bowler, Giorgio Dall'Olmo, Scott Freeman, Wendy Neary, Norm Nelson, Mike Novak, Chris Proctor, Wayne Slade, Toby Westberry

## ORAL SESSION 12

10:30 am – 10:50 am
**What can gliders tell us about the optical properties of the water column? A case-study of an eight year time series**
*TOPICS » Remote Sensing; Optical Inversions*
Catherine Mitchell, Bruce C. Bowler, Howard Gordon, William M. Balch

10:50 am – 11:10 am
**Discriminating diatom and non-diatom phytoplankton from space**
*TOPICS » Coastal Environment; Remote Sensing*
Guangming Zheng, Paul M. DiGiacomo

11:10 am – 11:30 am
**Suspended particulate matter variability of the global coastal waters over the MERIS time period**
*TOPICS » Remote Sensing; Coastal Environment; Global Scale*
Hubert Loisel, Vincent Vantrepotte, David Dessailly, François Steinmetz, Didier Ramon, Bing Han, Xavier Mériaux, Sylvain Ouillon, Arand Cauvin, Cedric Jamet

11:30 am – 11:50 am
**A model to estimate green tide biomass based on FAI ocean color index**
*TOPICS » Coastal Environment*
Lianbo Hu, Chuanmin Hu, Ming-Xia He

11:50 am – 12:10 pm
**Are existing models of size-fractionated primary productivity accurate for UK shelf seas?**
*TOPICS » Primary Productivity; Biogeochemistry*
Kieran F. Curran, Gavin H. Tilstone, Heather A. Bouman, Anna Hickman, Bob Brewin, Shubha Sathyendranath

## ORAL SESSION 13

01:30 pm – 01:50 pm
**Maximum likelihood estimation for hyperspectral remote sensing of coastal environments: a pixelwise approach**
*TOPICS » Remote Sensing; Coastal Environment*
Sylvain Jay, Mireille Guillaume, Audrey Minghelli, Yannick Deville, Malik Chami, Bruno Lafrance, Véronique Serfaty

01:50 pm – 02:10 pm
**Updated atmospheric correction scheme for the Geostationary Ocean Color Imager (GOCI)**
*TOPICS » Remote Sensing; Atmospheric Correction*
Jae-Hyun Ahn, Youngje Park, Wonkook Kim, Boram Lee

02:10 pm – 02:30 pm
**New opportunities and challenges for high resolution remote sensing in turbid water**
*TOPICS » Remote Sensing; Coastal Environment*
Kevin G. Ruddick, Quinten Vanhellemont, Ana I. Dogliotti, Bouchra Nechad, Nicholas Pringle, Dimitry Van der Zande

02:30 pm – 02:50 pm
**On the requirement of minimum signal-to-noise-ratio of ocean color sensors**
*TOPICS » Remote Sensing; Sensor Design; Observational Systems*
Lin Qi, Zhongping Lee, Chuanmin Hu, Menghua Wang

02:50 pm – 03:10 pm
**Ocean color remote sensing of extreme Case-2 waters**
*TOPICS » Remote Sensing; Radiative Transfer Modeling*
Martin Hieronymi, Hajo Krasemann, Dagmar Müller, Carsten Brockmann, Kerstin Stelzer, Ana Ruescas, Kevin Ruddick, Bouchra Nechad, Stefan Simis, Gavin Tilstone, François Steinmetz, Peter Regner

## ORAL SESSION 14

10:10 am – 10:30 am
**First autonomous bio-optical profiling float in the Red Sea: resolving the biological response to physical forcing**
*TOPICS » Observational Systems; Biogeochemistry*
Malika Kheireddine, Burton Jones, Khaled Asfahani, Mustapha Ouhssain

10:30 am – 10:50 am
**Can Bio-Argo radiometric data be used in validation of ocean colour products?**
*TOPICS » Observational Systems; Remote Sensing*
Nick Hardman-Mountford, Bozena Wojtasiewicz, Francois Dufois, Dirk Slawinski, Tom Trull, David Antoine

10:50 am – 11:10 am
**A red tide Phaeocystis bloom captured by an UAV**
*TOPICS » Coastal Environment; Biogeochemistry*
Shaoling Shang, Lianghai Shi, Zhongping Lee, Gong Lin, Chuanmin Hu, Lixia Lin

11:10 am – 11:30 am
**Combining high-tech glider optical, hydrographic and chemical measurements with canonical observations of Redfield (1934) to derive water column productivity**
*TOPICS » Primary Productivity; Coastal Environment*
William M. Balch, Bruce C. Bowler, David T. Drapeau

11:30 am – 11:50 am
**Autonomous backscattering and fluorescence measurements suggest widespread role of particle fragmentation in regulating the biological carbon pump.**
*TOPICS » Biogeochemistry; Instrument Techniques*
Nathan Briggs, Herve Claustre, Henry Bittig, Giorgio Dall'Olmo

# POSTER SESSIONS

## POSTER SESSION 1 » Monday 10/24, 5:00 pm – 7:00 pm

Poster 1
**The use of Landsat 8 in very turbid waters: a case study in French Guiana**
*TOPICS » Remote Sensing*
Noelia Abascal Zorrilla, Vincent Vantrepotte, Dat Ngoc, Antoine Gardel, Sylvain Morvan

Poster 4
**Neural network retrievals of harmful algal blooms in the West Florida Shelf from satellite observations. and comparisons with other techniques**
*TOPICS » Remote Sensing; Coastal Environment*
Samir Ahmed, Ahmed El-habashi, Vince Lovko, Richard Stumpf, Michelle Tomlinson

Poster 7
**Potential Karenia brevis Hot Spots on the West Florida Shelf**
*TOPICS » Remote Sensing*
Ruhul Amin, Inia Soto, Jennifer Wolny, Robert Arnone

Poster 10
**Phytoplankton acclimation in a cyclonic eddy: Southwest Indian Ocean**
*TOPICS » Phytoplankton*
Raymond Barlow, Tarron Lamont, Michael-John Gibberd, Ruth Airs

Poster 13
**Feasibility Study for a Coastal Ocean Color Imager**
*TOPICS » Observational Systems; Coastal Environment*
Martin Bergeron

Poster 16
**River remote sensing of water quality at high spatial resolution**
*TOPICS » Remote Sensing*
Stephen A. Bird, David R. Lapen, Graham A. Wilkes

Poster 19
**Synergistic Exploitation of Hyper-and Multispectral Sentinel-Measurements to Determine Phytoplankton Functional Types (PFT) at Best Spatial and Temporal Resolution**
*TOPICS » Remote Sensing; Phytoplankton Functional Types*
Astrid Bracher, Svetlana Loza, Mariana Altenburg Soppa, Aleksandra Wolanin, Tilman Dinter, Robert Brewin, Bricaud Annick, Vladimir V. Rozanov

Poster 22
**Optical properties of Subarctic Pacific surface waters across contrasting hydrographic and productivity regimes**
*TOPICS » Biogeochemistry*
William J. Burt, Philippe D. Tortell

Poster 25
**Optical tools for environmental monitoring**
*TOPICS » Environmental Management; Instrument Techniques*
Grace Chang, Craig Jones, Todd Martin, Frank Spada

Poster 28
**Seasonal variations of particle optical scattering properties in the Yellow Sea and Bohai Sea, China**
*TOPICS » Coastal Environment; Remote Sensing*
Shuguo Chen, Tinglu Zhang

Poster 31
**Using UV-polarization in space-borne ocean color observations to simultaneously retrieve absorbing aerosol and CDOM**
*TOPICS » Remote Sensing; Atmospheric correction, Radiative Transfer Modeling*
Jacek Chowdhary, Kirk D. Knobelspiesse, Brian Cairns

Poster 34
**Providing high quality chlorophyll-a data streams from moored observing systems over broad spatial and temporal scales.**
*TOPICS » Fluorescence; Observational Systems*
Lesley Clementson, Timothy P. Lynch, Paige Kelly, Darren Moore, Robert Kay

Poster 37
**BRDF effects over complex waters: strategy for remote-sensing**
*TOPICS » Remote Sensing*
Mazeran J. Constant, Jean-Paul Huot, Gerald Moore

Poster 40
**Absorption properties in the Ross Sea during austral summer and influence of water mass properties**
*TOPICS » High Latitudes*
Eurico J. D'Sa, Hyun-cheol Kim, Sun-yong Ha, Ishan Joshi

Poster 43
**GlobCoast, a new dataset for coastal water OCR**
*TOPICS » Coastal Environment*
David Dessailly, Hubert Loisel, François Steinmetz, Vincent Vantrepotte, Catherine Satra-Le Bris, Didier Ramon, Julien Meillon

Poster 46
**A Quantitative Comparison of Total Suspended Sediment Retrieval Algorithms for MODIS and Landsat-based Sensors**
*TOPICS » Remote Sensing; Sediments and Particles*
Passang Dorji, Peter R.C. Fearns

Poster 49
**Inferring Inherent Optical Properties and Ocean Impurity Profiles From Apparent Optical Properties**
*TOPICS » Remote Sensing*
Yongzhen Fan, Wei Li, Violeta Sanjuan Calzado, Charles Trees, Snorre Stamnes, Georges Fournier, David McKee, Knut Stamnes

Poster 52
**Phytoplankton light absorption and the package effect in relation to photosynthetic and photoprotective pigments in Antarctica**
*TOPICS » High Latitudes; Phytoplankton*
Amabile Ferreira, Carlos Rafael Borges Mendes, Áurea Maria Ciotti

Poster 55
**Comparing Methods to Measure Chlorophyll a using a flow-through system**
*TOPICS » Fluorescence; CDOM and FDOM*
Scott A. Freeman, Joaquin E. Chaves, Antonio Mannino

Poster 58
**A spectral model for correcting sunglint and skyglint**
*TOPICS » Remote Sensing*
Peter Gege, Philipp Groetsch

Poster 61
**Impact of Photosynthetically Available Radiation (PAR) on modeled primary production and hypoxia in the northern Gulf of Mexico**
*TOPICS » Ecosystem Models; Primary Productivity*
Richard W. Gould, Bradley Penta, Dong Ko, John C. Lehrter, Igor Shulman, Sherwin D. Ladner

Poster 64
**Narrowband spectral image restoration method for underwater objects**
*TOPICS » Underwater Imaging*
Yilu Guo, Hongbo Liu, Hong Song, Ping Yang, Jianxing Leng

Poster 67
**Complexity in dynamics around China's coastal waters from perspectives of bio-optical in-situ measurement and modeling**
*TOPICS » Coastal Environment; Biogeochemistry*
Bing Han, Jianhua Zhu, Jun Li, Hongli Zhou, Anan Yang, Fei Gao, Kai Guo, Di Jia

Poster 70
**Spectral availability of underwater light in Sognefjord and Trondheimsfjord, Norway.**
*TOPICS » Coastal Environment; Underwater Lightfield*
Rohan Henkel, Wenche Eikrem, Veloisa J. Mascarenhas, Kai Sörensen, Daniela Voss, Jochen Wollschläger, Oliver Zielinski

Poster 73
**Modeling the underwater light field in coastal arctic systems: An iteration process**
*TOPICS » Radiative Transfer Modeling; High Latitudes*
Lars Holinde, Oliver Zielinski

Poster 76
**Assessment of MCC method to estimate sea surface currents in highly turbid coastal waters from geostationary ocean color images**
*TOPICS » Remote Sensing*
Haiqing Huang, Zifeng Hu, Xianqiang He

Poster 79
**Hyperspectral Atmospheric Correction for Ocean Color remote sensing**
*TOPICS » Remote Sensing*
Amir Ibrahim, Bryan Franz, Zia Ahmad, Richard Healy, Bo Cai Gao

Poster 82
**Validating in-air remote sensing reflectance measurements during cruises using reflectance targets**
*TOPICS » Remote Sensing; Validation, Radiometry, Instrument Techniques*
B. Carol Johnson, Catherine Cooksey, Georgi Georgiev, Michael Ondrusek, Veronica Lance, Ryan Vandermeulen

Poster 85
**Assessing phytoplankton size structure from hyperspectral phytoplankton light absorption spectra measurements in the Red Sea: Implication for ocean color remote sensing.**
*TOPICS » Phytoplankton; Remote Sensing*
Malika Kheireddine, Emanuele Organelli, Mustapha Ouhssain, Burton H. Jones

Poster 88
**Multi-scene ensemble method for satellite-derived bathymetry**
*TOPICS » Radiative Transfer Modeling; Satellite-derived bathymetry*
Anders Knudby, Christopher Ilori

Poster 91
**Optical properties of CDOM in Nordic Seas and its relationships with apparent optical properties -- preliminary results from CDOM HEAT project**
*TOPICS » CDOM and FDOM; Remote Sensing*
Piotr Kowalczuk, Mirosław Darecki, Anna Raczkowska, Monika Zabłocka, Marta Konik

Poster 94
**Diurnal Cycle and Insolation of Ultraviolet (UV) and Photosynthetically Active Radiation (PAR) at the Sea Surface**
*TOPICS » Coastal Environment; Ecosystem Models*
Victor S. Kuwahara, Satoru Taguchi

Poster 97
**NOAA in situ validation activities for satellite ocean color products and related ocean science research**
*TOPICS » Remote Sensing*
Veronica P. Lance, Michael Ondrusek, Eric Stengel, Michael Soracco, Heng Gu, Menghua Wang

Poster 100
**Small phytoplankton contribution in the highly productive Ulleung Basin in the East/Japan Sea**
*TOPICS » Remote Sensing; Primary Productivity*
Sang Heon Lee, HuiTae Joo, Dabin Lee

Poster 103
**Sentinel-3 Mission Performance Centre (S3-MPC), preliminary assessment of OLCI level-2 and level-3 products.**
*TOPICS » Remote Sensing*
Christophe Lerebourg, Ludovic Bourg, Nicolas Lamquin, Philippe Goryl, David Antoine, Vincenzo Vellucci, Hervé Claustre, Giuseppe Zibordi, Simon Belanger, Bahjat Alhammoud

Poster 106
**A revised optimization approach to remove surface-reflected light for above-water measurement of remote sensing reflectance**
*TOPICS » Observational Systems*
Junfang Lin, Zhongping Lee, Jianwei Wei

Poster 109
**Effects of small-scale gold mining tailings on the underwater light field in the Tapajós River Basin/Brazilian Amazon**
*TOPICS » Environmental Management; River systems*
Felipe Lobo, Maycira Costa, Evlyn Novo, Kevin Telmer

Poster 112
**Design Study of COCI, a coastal and inland water hyperspectral imager for a potential Canadian contribution to PACE**
*TOPICS » Remote Sensing; Coastal Environment*
Julie Mandar, Louis Moreau, Jean-François Lavigne, Gary Buttner, Jennifer Busler, Martin Bergeron, Shen-En Qian

Poster 115
**A new algorithm for discriminating water sources from space: a case study for the southern Beaufort Sea using MODIS ocean color and SMOS salinity data**
*TOPICS » Remote Sensing; High Latitudes*
Atsushi Matsuoka, Marcel Babin, Emmanuel C. Devred

Poster 118
**An update on NASA's Generalized Inherent Optical Properties algorithm framework**
*TOPICS » Remote Sensing*
Lachlan I. McKinna, P. Jeremy Werdell, Bryan A. Franz

Poster 121
**A new inwater system for remote sensing reflectance measurements**
*TOPICS » Instrument Techniques*
Xavier Meriaux, Hubert Loisel, Van Hieu Nguyen, Cédric Jamet

Poster 124
**Evaluation and improvements of the OLCI atmospheric correction over optically-complex waters: OLCI/SLSTR synergy**
*TOPICS » Remote Sensing; Atmospheric correction*
Mohamed A. Mograne, Cedric Jamet

Poster 127
**Statistically Driven Fast Optimal Estimation of Coastal Ocean Biogeophysical Properties from Remotely Sensed Data**
*TOPICS » Remote Sensing; Coral Reefs*
Wesley J. Moses, Steven G. Ackleson, Bo-Cai Gao, Rong-Rong Li, Lauren A. Freeman

Poster 130
**Sentinel-2A captures high amplitude internal waves in the Strait of Gibraltar**
*TOPICS » Coastal Environment; Physical-biological coupling*
Gabriel Navarro, Isabel Caballero, Miguel Bruno, Agueda Vazquez

Poster 133
**Observing bio-optical anomalies in the world's oceans using autonomous Bio-Argo floats**
*TOPICS » Observational Systems*
Emanuele Organelli, Hervé Claustre, Annick Bricaud

Poster 136
**Diurnal variability of turbidity fronts observed by geostationary satellite ocean color remote sensing**
*TOPICS » Remote Sensing*
Delu Pan, Zifeng Hu, Xianqiang He, Yan Bai

Poster 139
**Regional chlorophyll-a algorithm evaluation for MODIS-Aqua and Sentinel-3 in the Salish Sea, Western Canada**
*TOPICS » Remote Sensing*
Stephen Phillips, Maycira Costa

Poster 142
**On the Green Edge: Bio-optical Observations from the Marginal Ice Zone in Baffin Bay using Gliders, Floats and Ship profiles**
*TOPICS » High Latitudes; Phytoplankton*
Eric Rehm, Guislain Bécu, Clémence Goyens, Griet Neukermans, Xiaogang Xing, Marcel Babin

Poster 145
**Analysis of constituents composition in coastal waters using new method for processing data obtained by passive remote sensing**
*TOPICS » Remote Sensing; Coastal Environment*
Vera Rostovtseva, Igor Goncharenko, Boris Konovalov

Poster 148
**Piecewise Regression Modeling of CDOM Absorption Spectra**
*TOPICS » CDOM and FDOM*
Guillermina Ruiz, Vivian Lutz, Robert Frouin

Poster 151
**ALOMEX-15 Alboran Sea & Saharan Upwelling Cruise**
*TOPICS » Underwater Imaging; Radiative Transfer Modeling*
Violeta Sanjuan Calzado, Emmanuel Coelho, Fraser Dalgleish, Anni Vuorenkoski, Will Hou, Filippo Campagnaro, Roberto Francescon, Masha Stroobant, Maria Manuela Reyes, Marina Bolado, Gabriel Navarro

Poster 154
**Validation of MERIS derived chlorophyll-a and Landsat 5/7 derived temperature in US lakes and reservoirs.**
*TOPICS » Lacustrine Environments; Environmental Management*
Blake A. Schaeffer, Robyn Conmy, John Dwyer, John Iiames, Darryl Keith, Keith Loftin, Jennifer Rover, Richard Stumpf, Michelle Tomlinson, Erin Urquhart, Jeremy Werdell, Bridget Seegers

Poster 157
**Strategic use of performance metrics for the assessment of satellite chlorophyll and cyanobacteria algorithms.**
*TOPICS » Environmental Management; Phytoplankton*
Bridget N. Seegers, Blake A. Schaeffer, Keith Loftin, Richard P. Stumpf, P. Jeremy Werdell

Poster 160
**VIIRS-derived Particle Backscattering Coefficient bbp in Highly Turbid Coastal and Inland Waters**
*TOPICS » Coastal Environment*
Wei Shi, Menghua Wang

Poster 163
**Looking for the best light transmission model for the Earth atmosphere and natural waters**
*TOPICS » Radiative Transfer Modeling*
Leonid Sokoletsky, Vladimir Budak

Poster 166
**Analysis and parameterization of absorption properties of northern Norwegian coastal water**
*TOPICS » CDOM and FDOM; Remote Sensing*
Jakob Stamnes, Ciren Nima, Øyvind Frette, Börge Hamre, Svein Rune Erga, Yi-Chun Chen, Lu Zhao, Kai Sörensen, Marit Norli, Knut Stamnes, Dennis Muyimbwa, Taddeo Ssenyonga, Nicolausi Ssebiyonga

Poster 172
**Beam attenuation spectra and flocculation dynamics in an estuary**
*TOPICS » Sediments and Particles*
Jing Tao, Paul S Hill, Emmanuel S Boss, Timothy G Milligan

Poster 175
**Estimates of temporal timescales of coastal processes using Himawari-8**
*TOPICS » Remote Sensing*
Nicholas Tufillaro, Curtiss O. Davis

Poster 178
**Influence of particle size on the mass-specific absorption coefficient for particles of two different minerals**
*TOPICS » Sediments and Particles*
Christian Utschig, Ruediger Roettgers

Poster 181
**Global coastal CDOM and DOC temporal variability (MERIS 2002-2012)**
*TOPICS » Coastal Environment*
Vincent Vantrepotte, Hubert Loisel, David Dessailly, Arnaud Calvin, Xavier Fériaux, Didier Ramon, François Steinmetz

Poster 184
**Hyperspectral light measurements from Chile to New Zealand with a special focus on the South Pacific Gyre system**
*TOPICS » Underwater lightfield; CDOM and FDOM*
Daniela Voss, Timothy G. Ferdelman, Rohan H. Henkel, Veloisa J. Mascarenhas, William L. Miller, Leanne C. Powers, Aron Stuubins, Oliver Zielinski

Poster 187
**Autonomous in situ hyperspectral reflectance data for validation of ocean colour imagery: the Sentinel-3 study**
*TOPICS » Remote Sensing; Coastal Environment*
Ziwei Wang, Maycira Costa, Nathan Vandenberg, Marcel R. Wernand, Yvonne Coady

Poster 190
**Near-bed sedimentary processes in maintaining deltaic coastlines, Fourleague Bay, Louisiana**
*TOPICS » Seafloor and Benthic Properties/Processes*
Jiaze Wang, Kehui Xu, Samuel J. Bentley, Giancarlo Restreppo

Poster 193
**Variability of phytoplankton absorption in two cyclonic eddies in the South China Sea**
*TOPICS » Remote Sensing*
Jingyu Wu, Shaoling Shang, Bangqin Huang, Yonghong Li, Shaoping Shang, Lei Wang

Poster 196
**Efficacious analytical model of beam spread function for ocean light radiative transfer**
*TOPICS » Radiative Transfer Modeling*
Zao Xu, Dick K.P. Yue

Poster 199
**Evaluation of ocean colour spectra acquired by ferry passengers in the Salish Sea**
*TOPICS » Crowdsourcing and Participatory Science*
Yuyan Yang, Laura Cowen, Maycira Costa, Ziwei Wang, Valerie Leithoff

Poster 202
**Complexity of optical response and coupling with physical and biological processes in the central Red Sea**
*TOPICS » Observational Systems; Remote Sensing*
Nikolaos Zarokanellos, Surya Prakash Tiwari, Burton H. Jones

Poster 205
**Extension Observation of the Yangtze River Diluted Water in Summer with Geostationary Ocean Color Imager (GOCI) Data**
*TOPICS » Remote Sensing; Coastal Environment*
Tinglu Zhang, Jingwen Hu, Shuguo Chen

Poster 208
**Hyperspectral Differentiation of Benthic Communitiesin Natural Environments**
*TOPICS » Coral Reefs; Seafloor and Benthic Properties/Processes*
Laura Zoffoli, Milton Kampel, Robert Frouin, Zhongping Lee

## POSTER SESSION 2 » Tuesday 10/25, 3:10 pm – 5:00 pm

Poster 2
**Constituent-Specific Optical Properties in the Delta Region of the Sacramento River and Northern San Francisco Bay**
*TOPICS » Coastal Environment; Ecosystem Models*
Steven G. Ackleson, W. Joseph Rhea, Sarah Blaser, Frances Wilkerson, Richard Dugdale, Curtiss O. Davis, Nick Tufillaro

Poster 5
**Improved retrieval of Secchi depth for optically-complex waters using remote sensing data**
*TOPICS » Remote Sensing*
Krista Alikas, Susanne Kratzer

Poster 8
**Assessment of phytoplankton community structure and distribution in the Adriatic Sea-Italy during the 2015 spring season**
*TOPICS » Phytoplankton*
Florinda Artuso, Dario Cataldi, Salvatore Marullo, Antonia Lai, Annalisa Di Cicco, Michela Sammartino, Simone Colella, Gianluca Volpe, Rosalia Santoleri, Chiara Cristini, Francesco Colao, Federico Angelini, Antonio Palucci

Poster 11

**The Optical Phytoplankton Discriminator: new capabilities and recent applications**

*TOPICS » Instrument Techniques; Phytoplankton*

Jordon Beckler, Benjamin Carothers, L. Kellie Dixon, Karl Henderson, Jim Hillier, Gary Kalmanovich, Gary Kirkpatrick, Aaron Lafferty, Oscar Schofield, Jonathan Turner

Poster 14

**Variations in the absorption coefficients of phytoplankton, non-pigmented particles, and dissolved organic matter in European coastal waters: a reappraisal based on sea surface reflectance classification ("BiOMaP" data set)**

*TOPICS » Radiative Transfer Modeling; Bio-optical measurements and modeling; Coastal Environment*

Jean-Francois Berthon, Frédéric Melin, Giuseppe Zibordi, Elisabetta Canuti, Lukasz Jankowski

Poster 17

**Ocean and Land Colour Instrument (OLCI) commissioning phase results**

*TOPICS » Observational Systems; Instrument Techniques*

Marc Bouvet, Jens Nike, Philippe Goryl, Craig Donlon, Ewa Kwiatkowska, Malcolm Taberner

Poster 23

**Characterizing the phytoplankton soup: pump and plumbing effects on the particle assemblage in underway optical seawater systems**

*TOPICS » Remote Sensing; Biogeochemistry*

Ivona Cetinic, Nicole J. Poulton, Wayne Homer Slade, Mary Jane Perry

Poster 26

**An algorithm for estimating phytoplankton pigments from reflectance spectra**

*TOPICS » Phytoplankton; Remote Sensing*

Alison P. Chase, Emmanuel Boss

Poster 29

**The correlation of CDOM and spectral slopes in six different Case 2 water bodies**

*TOPICS » Remote Sensing*

Yi-Chun Chen, Ciren Nima; Øyvind Frette, Børge Hamre, Svein Rune Erga, Lu Zhao, Dennis Muyimbwa, Taddeo Ssenyonga, Nicolausi Ssebiyonga, Willy Okullo, Knut Stamnes, Jakob J. Stamnes

Poster 32

**Pico and ultraphytoplankton taxonomy and its relationship with spectral light absorption and pigments composition in a subtropical coastal region**

*TOPICS » Phytoplankton; Bio-optical Proxies of Community Structure*

Aurea Ciotti, Maria Fernanda Coló Giannini, Alexandre Castagna

Poster 35

**GOCI processing with SeaDAS: Validation of the Atmospheric Correction**

*TOPICS » High Latitudes; CDOM and FDOM*

Javier A. Concha, Antonio Mannino

Poster 38

**A road map for autonomous, continuous in situ above-water hyperspectral reflectance data from ferry platforms: Salish Sea waters and Sentinel-3 validation**

*TOPICS » Observational Systems; Remote Sensing*

Maycira Costa, Stephen Phillips, Ziwei Wang, Nathan Vandenberg, Yvonne Coady, Denis Hedji, Reyna Jenkyns

Poster 41

**Remote Sensing of Suspended Particulate Matter and Algal Blooms in San Francisco Bay and Estuary Using Landsat 8 OLI**

*TOPICS » Coastal Environment; Remote Sensing*

Curtiss O. Davis, Nicholas B. Tufillaro, Richard C. Dugdale, Frances Wilkerson, Steve Ackleson

Poster 44

**Absorption budget on the Scotian Shelf, Canada: implications for remote sensing of ocean colour**

*TOPICS » Phytoplankton; Remote Sensing*

Emmanuel Devred, Carla Caverhill, Heidi Maass, Edward Horne, Tim Perry

Poster 47

**Fluxes and dynamics of suspended particles in a river plume by combining in situ autonomous measurements and multi-sensor ocean colour satellite data**

*TOPICS » Coastal Environment; Sediments and Particles, River Plumes*

David Doxaran, Anouck Ody, Bernard Gentili, Quinten Vanhellemomt, Romaric Verney, Ivane Pairaud

Poster 50

**Multi-sensor monitoring of dredge operations in Western Australia**

*TOPICS » Environmental Management; Remote Sensing*

Peter R. Fearns, Mark Broomhall, Passang Dorji

Poster 53

**A simple model for the backscatter and scattering coefficients of Coccoliths and Coccolithophores**

*TOPICS » Phytoplankton*

Georges Fournier, Griet Neukermans

Poster 56

**Monitoring of in situ phytoplankton community structure using multi-excitation chlorophyll fluorometer on the Chukchi Sea**

*TOPICS » Phytoplankton; High Latitudes*

Amane Fujiwara, Shigeto Nishino, Jonaotaro Onodera, Toru Hirawake, Yusuke Kawaguchi, Koji Suzuki, Takashi Kikuchi

Poster 59

**Polarimetric observations of the ocean during the SABOR cruise: radiative transfer closure and new capabilities**

*TOPICS » Remote Sensing; Radiative Transfer Modeling*

Alex Gilerson, Matteo Ottaviani, Robert Foster, Amir Ibrahim, Carlos Carrizo, Brian Cairns, Jacek Chowdhary, Chris Hostetler, Johnathan Hair, Yonghiang Hu, Michael Behrenfeld, Michael Twardowski, Nicole Stockley, Deric Gray, Wayne Slade, Ivona Cetinic

Poster 62
**Effects of an Arctic under-ice phytoplankton bloom on bio-optical properties of surface waters during the Norwegian Young Sea Ice Cruise (N-ICE2015)**
*TOPICS » High Latitudes; Phytoplankton*
Mats Granskog, Alexey K. Pavlov, Torbjørn Taskjelle, Hanna Kauko, Børge Hamre, Stephen R. Hudson, Colin A. Stedmon, Piotr Kowalczuk, Christopher-John Mundy, Marcel Nicolaus, Mar Fernandez-Mendez, Philipp Assmy

Poster 65
**Approach for calibration of bio-optical sensors on profiling floats applied in the Southern Ocean**
*TOPICS » Observational Systems; High Latitudes*
Nils Haëntjens, Emmanuel S. Boss

Poster 68
**Estimation of daily Photosynthetically Available Radiation (PAR) under aerosol plumes: application to MERIS and OLCI/ Sentinel-3 satellite data.**
*TOPICS » Remote Sensing*
Tristan Harmel, Malik Chami

Poster 71
**Improving spatial coverage of ocean colour data using Data Interpolating Empirical Orthogonal Functions**
*TOPICS » Remote Sensing; Phytoplankton*
Andrea Hilborn, Maycira Costa, Tyson Carswell

Poster 74
**Introducing Katie (K-T): a high-speed, high-resolution temperature sensor based on fiber optics**
*TOPICS » Instrument Techniques; Observational Systems*
Weilin Hou, Ming Han, Guigen Liu, Silvia Matt

Poster 77
**Seasonal variation in daily patterns of the quantum yield of fluorescence**
*TOPICS » Fluorescence; Phytoplankton*
Yannick Huot, David Antoine

Poster 80
**An optimal atmospheric correction procedure for bathymetry mapping in shallow waters**
*TOPICS » Shallow Water; Radiative Transfer Modeling*
Christopher Ilori, Anders Knudby

Poster 83
**Spring development: a study on hydrography and water quality in Himmerfjärden bay, in the north-western Baltic proper**
*TOPICS » Coastal Environment*
Elina Kari, Ioanna Merkouriadi, Susanne Kratzer, Matti Leppäranta

Poster 86
**Overview of the Korea-US Joint Field Campaign for Ocean Color (KORUS-OC 2016) and the Preliminary Results for Geostationary Ocean Color Imager (GOCI)**
*TOPICS » Remote Sensing*
Wonkook Kim, Young-Je Park, Joseph Salisbury, Maria Tzortziou, Antonio Mannino

Poster 89
**Experimental estimates of the contributions of different particle size classes to the optical scattering of seawater**
*TOPICS » Inherent Optical Properties*
Daniel W. Koestner, Dariusz Stramski, Rick A. Reynolds

Poster 92
**Ecological Trophic State Estimation of Inner Lakes with Optical Remote Sensing Data**
*TOPICS » Remote Sensing; Environmental Management*
Harald Krawczyk, Mortimer Werther, Helge Witt, Carsten Brockmann

Poster 95
**Sentinel-3 OLCI products, data services and initial applications**
*TOPICS » Remote Sensing; Observational Systems*
Ewa J. Kwiatkowska, Malcolm Taberner, Vincenzo Santacesaria, Marc Bouvet, Rosalia Santoleri, Philippe Goryl, Craig Donlon, Hans Bonekamp

Poster 98
**Evaluation of the FLAASH atmospheric correction and detection of chlorophyll a in extremely turbid waters using MERIS FR and airborne hyperspectral data**
*TOPICS » Remote Sensing; Coastal Environment*
Morgane Larnicol, Patrick Launeau, Pierre Gernez

Poster 101
**Why Secchi disk depth is dependent on the diffuse attenuation coefficient rather than the beam attenuation coefficient?**
*TOPICS » Radiative Transfer Modeling; Remote Sensing*
Zhongping Lee

Poster 104
**A preliminary comparison on applications of lidar in atmospheric and oceanographic detection**
*TOPICS » Remote Sensing*
Yajuan Li

Poster 107
**Reconstruction of Missing Pixels in VIIRS Ocean Color Images Using the Data Interpolating Empirical Orthogonal Function (DINEOF)**
*TOPICS » Remote Sensing; Coastal Environment*
Xiaoming Liu, Menghua Wang

Poster 110
**Examination of water quality of an oligotrophic salmon lake in British Columbia, Canada using MERIS satellite imagery**
*TOPICS » Remote Sensing; Water Quality*
Eduardo Loos, Gary Borstad, Leslie Brown, Kaan Ersahin, Daniel Selbie, James Irvine, Maycira Costa

Poster 113
**Science of the Arctic-COLORS NASA field campaign scoping study on coastal land ocean interactions**
*TOPICS » High Latitudes*
Antonio Mannino, Carlos E. Del Castillo, Marjorie A Friedrichs, Peter J. Hernes, Patricia Matrai, Joseph Salisbury, Maria Tzortziou

Poster 116
**Inversion of in situ absorption and attenuation measurements to estimate constituent concentrations in optically complex shelf seas**
*TOPICS » Instrument Techniques; Coastal Environment*
David McKee, Marta Ramirez-Pérez, Mike Twardowski, Charles Trees, Jaume Piera

Poster 119
**Relationships between inherent optical properties and biogeochemical parameters in the NW Mediterranean Sea (BOUSSOLE site)**
*TOPICS » Biogeochemistry; Observational Systems*
Golbol Melek, Vincenzo Vellucci, Annick Bricaud, David Antoine, Bernard Gentili, Emilie Diamond

Poster 122
**Statistical Evaluation of VIIRS Ocean Color Data Retrievals**
*TOPICS » Remote Sensing; Ocean Color*
Karlis Mikelsons, Lide Jiang, Menghua Wang

Poster 125
**Angular and vertical variation of LiDAR-derived optical properties in optically complex waters**
*TOPICS » LiDAR*
Martin A. Montes, Anni Vuorenkoski, Fraser Dalgleish, Bing Ouyang, Michael Twardowski, Nicole Stockley, Schuyler Nardelli

Poster 128
**Global shifts in phytoplankton community size structure in response to environmental controls**
*TOPICS » Remote Sensing; Phytoplankton*
Colleen B. Mouw, Audrey Barnett

Poster 131
**Absorption of Dissolved Organic Carbon to Glass Fiber Filters used to collect Particulate Organic Carbon: Assessing the impact on in situ and satellite measurements**
*TOPICS » Remote Sensing; Biogeochemistry*
Mike Novak, Antonio Mannino, P. Jeremy Werdell, Ivona Cetinic, Joaquin E. Chaves

Poster 134
**Polarimetric imaging and radiative transfer modeling of the atmosphere-ocean system**
*TOPICS » Remote Sensing; Polarimetric Imaging, Radiative Transfer Modeling*
Matteo Ottaviani, Carlos Carrizo, Anna McGilloway, Ahmed El-Habashi, Robert Foster, Alex Gilerson

Poster 137
**Modeling primary productivity during the MIZ experiment from gliders**
*TOPICS » High Latitudes; Primary Productivity*
Mary Jane Perry, Craig M. Lee, Luc Rainville, Ivona Cetinic, Eun Jin Yang, Sung-Ho Kang, Brandon Sackmann

Poster 143
**First attempt to identify phytoplankton species assemblages from space using large in-situ data analysis and phenological metrics applied to ocean-colour radiances anomalies**
*TOPICS » Phytoplankton; Remote Sensing*
Anne-Helene Reve, S. Alvain, M.F. Racault

Poster 149
**Ferries for Science: Using optics to monitor and understand the role of Noctiluca in the Puget Sound food web**
*TOPICS » Coastal Environment; Observational Systems*
Brandon S. Sackmann, Christopher Krembs, Suzan Pool, Julia Bos

Poster 152
**Quantifying Seasonal Chromophoric Dissolved Organic Matter (CDOM) Distribution in the Pacific Arctic Region**
*TOPICS » CDOM and FDOM; Biogeochemistry*
Melishia I. Santiago, Karen E. Frey

Poster 155
**Remote Sensing of Bull Kelp (Nereocystis leutkeana) in the Salish Sea using SPOT 6 and World View 3 satellites**
*TOPICS » Remote Sensing; Coastal Environment*
Sarah B. Schroeder, Leanna Boyer, Jennifer O'Neil, Maycira Costa

Poster 158
**Shadow error in water-leaving radiance measurements estimated from Monte-Carlo simulations**
*TOPICS » Radiative Transfer Modeling*
Zhehai Shang, Zhongping Lee

Poster 164
**Evaluation of VIIRS Ocean Color Products in Open Ocean and Coastal/Inland Waters**
*TOPICS » Remote Sensing; Observational Systems*
Seunghyun Son, Menghua Wang

Poster 167
**Retrieval of atmospheric and marine parameters in coastal and inland environments from geostationary platforms: challenges and opportunities**
*TOPICS » Remote Sensing; Coastal Environment*
Knut Stamnes, Wei Li, Zhenyi Lin, Yongzhen Fan, Charles Gatebe, Jakob J. Stamnes

Poster 170
**Characterizing natural, undisturbed particle size and 3-D spatial distributions using in situ holographic microscopy**
*TOPICS » Phytoplankton; Sediments and Particles*
James M. Sullivan, Michael S. Twardowski, Aditya R. Nayak, Malcolm N. McFarland, Nicole Stockley

Poster 173
**Effects of under-ice bloom on heating of the water column underneath Arctic sea ice**
*TOPICS » High Latitudes; Radiative Transfer Modeling*
Torbjørn Taskjelle, Mats A. Granskog, Alexey K. Pavlov, Stephen R. Hudson, Børge Hamre

Poster 176
**Performance assessments of ocean color inversions that explicitly depend on the volume scattering function**
*TOPICS » Remote Sensing; Instrument Techniques*
Michael Twardowski, Alberto Tonizzo

Poster 179
**Validation of Landsat-8/OLI and Sentinel-2/MSI for ocean colour applications with AERONET-OC sites in Belgian coastal waters**
*TOPICS » Remote Sensing; Coastal Environment*
Dimitry Van der Zande, Quinten Vanhellemont, Liesbeth De Keukelaere, Els Knaeps, Kevin Ruddick

Poster 182
**Evaluation of atmospheric correction over complex turbid waters**
*TOPICS » Remote Sensing; Radiative Transfer Modeling*
Sundarabalan Velaudhaperumal Balasubramanian, Cedric Jamet, Sean Bailey, Julien Brajard, Xianqiang He, Kevin Ruddick, Palanisamy Shanmugam, Thomas Schroeder, Knut Stamnes, Sindy Sterckx, Menghua Wang

Poster 185
**Progress on MOBY-Net and MOBY-Refresh**
*TOPICS » Instrument Techniques; Remote Sensing*
Kenneth J Voss, B. Carol Johnson, Mark Yarbrough, Arthur Gleason, Stephanie Flora, Michael Feinholz

Poster 188
**Retrieval of concentrations of multiple pigments in oceanic waters from hyperspectral remote sensing reflectance**
*TOPICS » Remote Sensing; Phytoplankton*
Guoqing Wang, Zhongping Lee

Poster 191
**The Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) Mission**
*TOPICS » Remote Sensing; Phytoplankton*
Jeremy Werdell

Poster 194
**Hyperspectral Differentiation of Phytoplankton Taxonomic Groups: A Comparison between Using Remote Sensing Reflectance and Absorption Spectra**
*TOPICS » Phytoplankton*
Hongyan Xi, Martin Hieronymi, Rudiger Röttgers, Hajo Krasemann, Zhongfeng Qiu

Poster 197
**A Preliminary Practice for Monitoring of Inshore Aquaculture Cages Using UAV**
*TOPICS » Remote Sensing; Observational Systems*
Jing Yan, Cai Yun Zhang, Yong Nian Zhang, Xue Ding Li, Ning Zhang, Shan Jiang, Shao Ling Shang

Poster 200
**Using in vivo fluorescence detection to test ballast water compliance**
*TOPICS » Instrument Techniques; Ballast Water Research, Fluorescence*
Lawrence Younan, Pamela Mayerfeld

Poster 206
**Do we witness a coastal ocean darkening?**
*TOPICS » Coastal Environment*
Oliver Zielinski, Emil V. Stanev, Maren Striebel, Marcel R. Wernand

Poster 209
**Investigating interaction of solar radiation and first year sea-ice in the Arctic Ocean with autonomous radiation platforms**
*TOPICS » High Latitudes*
Alexey K Pavlov, Stephen R Hudson, Mats A Granskog, Sebastian Gerland, Børge Hamre, Don K Perovich, Chris Polashenski, Torbjørn Taskjelle, Caixin Wang, Jeremy Wilkinson

## POSTER SESSION 3 » Wednesday 10/26, 4:30 pm – 6:30 pm

Poster 3
**A Novel Approach for Estimating Vertical Profiles of Suspended Sediment Concentration**
*TOPICS » Instrument Techniques; Remote Sensing*
Joe H. Adelson, Oliver B. Fringer

Poster 6
**Retrieval of the phytoplankton size distribution from satellite imagery**
*TOPICS » Remote Sensing; Phytoplankton*
James G. Allen, David A. Siegel

Poster 9
**Remote sensing of sea surface $pCO_2$ in the Bering Sea in summer based on a mechanistic semi-analytical algorithm (MeSAA)**
*TOPICS » Biogeochemistry; Remote Sensing*
Yan Bai, Xuelian Song, Wei-Jun Cai, Chen-Tung Arthur Chen, Delu Pan, Xianqiang He

Poster 12
**Arctic Primary Productivity on the Polar Data Catalog**
*TOPICS » Primary Productivity; High Latitudes*
Maxime Benoit-Gagne, Emmanuel Devred, David Dessailly, Simon Bélanger, Marcel Babin, Mathieu Ardyna, Eric Rehm

Poster 15
**An uncertainty budget for the radiometry component of the BOUSSOLE project, as derived using a Monte Carlo Method**
*TOPICS » Observational Systems; Remote Sensing*
Agnieszka Bialek, Vincenzo Vellucci, Bernard Gentili, David Antoine, Nigel Fox

Poster 18
**Observed Differences in Polarimetric Signatures Taken Over Different Water Types**
*TOPICS » Remote Sensing; Observational Systems*
Jeffrey H. Bowles, Deric J. Gray, Marcos J. Montes, David B. Gillis, Daniel R. Korwan, Gia M. Lamela, William D. Miller

Poster 21
**Bias reduction in SeaWiFS radiometric products affected by adjacency effects**
*TOPICS » Remote Sensing; Radiative Transfer Modeling*
Barbara Bulgarelli, Giuseppe Zibordi, Frederic Melin

Poster 24
**Angular shape of the volume scattering function of various hydrosols (phytoplankton and minerals) over a wide range of scattering angles (from 0.1° to 175°) measured by recent VSF-meters instruments**
*TOPICS » Instrument Techniques; Sediments and Particles*
Malik Chami, Tristan Harmel, Martin Hieronymi, Wayne Slade, Rudiger Röttgers

Poster 33
**spectRal – A new Open Source R package for working with spectral data with geospatial attributes**
*TOPICS » Crowdsourcing and participatory science; Software environment for optical field data analysis*
Servet A. Cizmeli

Poster 36
**Subsea oil plume simulations: Tracking oil droplet size distribution and fluorescence within high release jets**
*TOPICS » Environmental Management*
Robyn N. Conmy, Brian Robinson, Thomas King, Mary Abercrombie, Scott Ryan, Claire McIntyre, Michel Boufadel, Ken Lee

Poster 39
**Ocean Colour Insights into Phytoplankton Contributions to Climate-Relevant Aerosols and Gases on the Scotian Shelf**
*TOPICS » Phytoplankton; Ocean-atmosphere interaction, Remote Sensing*
Susanne E. Craig, Mark D. Gibson, Thomas C. Barnett, Courtney Wilson, Haya Qadoumi, Alan Wilson

Poster 42
**Bio-Optical Variability at a Vancouver Island Aquaculture Site**
*TOPICS » Environmental Management; Aquaculture*
Justin Del Bel Belluz, Maycira Costa, Gregor Reid, Stephen Cross

Poster 45
**Development of Major New Instrumentation for High Accuracy Measurement of Backscattering-Bb and Total Scattering-b in Natural waters**
*TOPICS » Sediments and Particles; Remote Sensing*
Michael Dewey, Edward Fry, Eleonora Figueroa, Michael Twardowski, Andrey Prosvirin, Cristina Orrico, Andrew Barnard

Poster 48
**Accelerating Monte Carlo ocean radiative transfer simulation using GPU technique**
*TOPICS » Radiative Transfer Modeling*
Keping Du, Kun Xue, Zhongping Lee

Poster 51
**Detection of Mesoscale Eddies in the eastern Caribbean Sea using sea water bio-optical properties**
*TOPICS » Remote Sensing*
Angela M. Ferra

Poster 54
**Estimating uncertainty in the retrieval of water-leaving reflectance from spaceborne ocean color sensors**
*TOPICS » Remote Sensing*
Bryan Franz, Erdem M. Karaköylü

Poster 57
**Spectral reflectance characteristics of marine plastic debris from the visible to shortwave infrared wavelengths and potential for remote sensing**
*TOPICS » Remote Sensing*
Shungu Garaba, Heidi M. Dierssen

Poster 60
**The effect of interannual processes on phytoplankton community structure off Northern Baja California Peninsula (México): 2007-2015.**
*TOPICS » Phytoplankton*
Adriana Gonzalez-Silvera, Eduardo Martin Santamaria-del-Angel, Roberto Millan-Núñez, Victor Camacho-Ibar, Alfredo Mercado, Stella Betancur

Poster 63
**Optically estimating CDOM composition across diverse spectral ranges**
*TOPICS » CDOM and FDOM*
Brice Grunert, Colleen B. Mouw, Audrey Barnett

Poster 66
**A physically founded model for light absorption by colored dissolved organic matter (CDOM)**
*TOPICS » CDOM and FDOM*
Børge Hamre, Jakob J Stamnes, Knut Stamnes, Ciren Nima, Yi-Chun Chen, Torbjørn Taskjelle, Øyvind Frette

Poster 69
**A new simple concept for ocean color remote sensing using parallel polarization radiance**
*TOPICS » Remote Sensing; Radiative Transfer Modeling*
Xianqiang He, Delu Pan, Yan Bai, Difeng Wang, Zengzhou Hao

Poster 72
**Retrieval of the fraction of PAR absorbed by live phytoplankton from remote sensing reflectance**
*TOPICS » Primary Productivity; Remote Sensing*
Toru Hirawake, Robert Frouin

Poster 75
**A satellite-based system to observe algal blooms and water quality in near real-time**
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Xia Lei, Jiayi Pan

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Zhenyi Lin, Yongzhen Fan, Wei Li, Charles Gatebe, Knut Stamnes

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**Monitoring of Suspended Particulate Matter with GOCI on the Fukushima coast after the tsunami and the nuclear power plant accident (March 2011)**
*TOPICS » Remote Sensing; Geostationary sensor, GOCI, SPM, atmospheric correction, Sediments and Particles*
Audrey Minghelli, Manchun Lei, Sabine Charmasson

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**Optical properties of western Lake Erie during summertime algal blooms**
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*TOPICS » Remote Sensing; Coastal Environment*
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Nima Pahlevan, Jean-Claude Roger

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Richard Reynolds, Dariusz Stramski, Griet Neukermans

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*TOPICS » Fluorescence; Remote Sensing*
Pascale Roy, Yannick Huot

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**Underwater Hyperspectral Imaging**
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Mike Sayers, John Lekki, Larry Liou, Robert Shuchman, Reid Sawtell, Robert Anderson, Glenn Sullivan

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*TOPICS » Data Management; Biogeochemistry*
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**Classification of Several Optically Complex Waters in China using in Situ Remote Sensing Reflectance**
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**Remote Sensing for Oyster Aquaculture Site Selection in Maine**
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*TOPICS » Instrument Techniques; Underwater Imaging*
Heidi M. Sosik, Robert J. Olson, Emily F. Brownlee, Bennett S. Lambert, Michael L. Brosnahan, E. Taylor Crockford, Emily E. Peacock, Alexi Shalapyonok

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**Mass-specific scattering cross sections of Coastal Ocean Suspended Particulate Inorganic Matter (PIM)**
*TOPICS » Sediments and Particles; Coastal Environment*
Robert H. Stavn, Xiaodong Zhang, Alexander U. Falster, Deric Gray, Johannes J. Rick, Richard W. Gould

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**Offshore Microplastics Search**
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Timothy S. Sullivan, Bill Robberson, Anna-Marie Cook, Harry Allen

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**Applicability of current atmospheric correction techniques in the Red Sea**
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Surya Prakash Tiwari, Mustapha Ouhssain, Burton H. Jones

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Masada Tzabari, Carynelisa Erlick, Danielle Meir

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**Determining the optimal spectral sampling frequency for various water types**
*TOPICS » Remote Sensing*
Ryan A. Vandermeulen, Antonio Mannino, Aimee Neeley

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**First validation of Sentinel-3A OLCI products using a combination of mooring, profiling float and ship observations**
*TOPICS » Observational Systems; Remote Sensing*
Vincenzo Vellucci, David Antoine, Edouard Leymarie, Bernard Gentili, Melek Golbol, Christophe Lerebourg, Ludovic Bourg

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Menghua Wang, Lide Jiang, Xiaoming Liu, SeungHyun Son, Junqiang Sun, Karlis Mikelsons, Wei Shi, Liqin Tan, Xiaolong Wang, Veronica Lance

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**On the long term change of Sargassum Abundance in the Intra-American Seas and tropical Atlantic**
*TOPICS » Environmental Management*
Mengqiu Wang, Chuanmin Hu

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**Obligatory historic ship measurements and modern techniques; grace in marine optical research**
*TOPICS » Crowdsourcing and Participatory Science*
Marcel R. Wernand, Hendrik Jan van der Woerd, Oliver Zielinski, Peter Thijsse

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**The effect of particle phase functions on the remote-sensing reflectance**
*TOPICS » Remote Sensing*
Yuanheng Xiong, Xiaodong Zhang, Shuangyan He

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**Simulation of the optical properties of large realistic organic and inorganic oceanic particles**

*TOPICS » Radiative Transfer Modeling; Remote Sensing*

Ping Yang, Guanglang Xu, Guanglin Tang, Jiachen Ding, Bingqiang Sun, George W. Kattawar, Xiaodong Zhang

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**Composition of dissolved organic matter in Nordic Seas from fluorescence spectroscopy and Parallel Factor Analysis.**

*TOPICS » CDOM and FDOM; High Latitudes*

Monika D Zablocka, Anna Raczkowska, Piotr Kowalczuk, Katarzyna Draganska, Karolina Borzycka, Agnieszka Zdun, Justyna Meler

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**Soft Classification Based Chlorophyll-a Estimation Algorithm by Remote Sensing in Inland Water**

*TOPICS » Remote Sensing*

Fangfang Zhang, Junsheng Li, Qian Shen, Bing Zhang

# TOWN HALLS, SHORT COURSES, WORKSHOPS, AND MEETINGS

## Sunday 10/23

9:00 am – 5:00 pm
**MEETING » PACE Science Team**
VCC Sidney
*» By invitation*
This is a meeting of the PACE Science Team. Please contact Emmanuel Boss (emmanuel.boss@maine.edu) for more information.

9:00 am – 1:00 pm (Day 2)
**SHORT COURSE » SeaDAS**
VCC View Royal
*» Saturday and Sunday, October 22 and 23, 2016*
*» Pre-registration required; cost $45 (includes coffee breaks)*
This short course will be a two-day event describing the features and functionalities of SeaDAS that includes a series of lectures and hands-on training. Participants are encouraged to bring their own laptops with SeaDAS installed, as well as questions and example analyses. Participation will be limited to 40 people. Please contact Aynur Abdurazik (aynur.abdurazik@nasa.gov) with any questions.

9:00 am – 5:00 pm
**SHORT COURSE » Modeling Sea Surfaces**
VCC Colwood
*» Pre-registration required; cost $150 (includes lunch and coffee breaks)*
Wind-blown sea surfaces are extremely complex. Understanding sea surfaces is fundamental to understanding and modeling oceanic light fields. Realistic modeling of sea surfaces as needed for accurate calculations of optical reflectance and transmittance requires both physical and mathematical sophistication, and there are many subtleties that are often ignored in the literature. This course will present the physical and mathematical techniques needed for accurate modeling of random sea surfaces, including both elevation and slope statistics. Topics will include (1) modeling sea surfaces as sums of sinusoids; (2) sampling of surfaces; (3) continuous and discrete Fourier transforms; (4) wave variance spectra; (5) generation of one- and two-dimensional random sea surface realizations using elevation variance spectra, random numbers, and Fourier transforms; (6) computational issues and accounting for numerically unresolved elevation and slope variance; (7) generation of time-dependent, two-dimensional surface realizations; (8) limitations of Fourier techniques. If time permits, applications such as estimation of surface reflectance and transmittance via Monte Carlo ray tracing will be outlined. The level of presentation assumes a knowledge of only basic physics, calculus, and complex numbers; no previous knowledge of Fourier transforms or wave variance spectra will be required. Participants will be given detailed course notes, as well as source code to generate sea surface realizations. Please contact Curtis Mobley (curtis.mobley@sequoiasci.com) with any questions.

## Monday 10/24

6:00 pm – 8:30 pm
**MEETING » IOCCG Executive Meeting**
VCC Langford

7:15 pm – 8:15 pm
**TOWN HALL » GEO AquaWatch**
VCC Theatre
AquaWatch is an activity within the Group on Earth Observations that aims to develop international operational water quality information systems based on Earth observations with a focus on the developing world. The overall goal of AquaWatch is to produce a global water quality monitoring and forecasting service within 10 years using in situ data, remote sensing data and modeling and data assimilation. The goal of GEO AquaWatch town hall is to introduce the Ocean Optics community to AquaWatch and present opportunities for involvement in AquaWatch. In addition, AquaWatch member Maycira Costa of the University of Victoria will present examples of water quality monitoring projects.

# Tuesday 10/25

12:30 pm – 1:30 pm

### MEETING » IOCCG Executive Meeting

VCC Langford

- By invitation

5:00 pm – 7:00 pm

### TOWN HALL » Status Updates on Ocean Color Satellite Instruments and Missions

VCC Theatre

» Canadian Space Agency/COCI (Martin Bergeron)
» Sentinel-3/OLCI (Ewa Kwiatkowska)
» Sentinel-2/MSI (Marc Bouvet)
» DLR/EnMAP (Harald Krawczyk)
» CONAE/SABIA-MAR (Daniel Caruso)
» Decadal Survey/Advanced Planning (Maria Tzortziou)
» NASA/GEO-CAPE (Antonio Mannino)
» NASA/HyspIRI (Steve Ackleson)
» JAXA/SGLI (Toru Hirawake)
» KIOST/GOCI (Wonkook Kim)
» ISRO/OCM-2 (Prakash Chauhan)
» NOAA/JPSS-1,2 (Menghua Wang)
» NASA/SeaWiFS-MODIS-VIIRS (Bryan Franz)
» NASA/PACE (Jeremy Werdell)
» NASA/Earth Science Division (Paula Bontempi)

7:15 pm – 8:45 pm

### WORKSHOP » NOAA VIIRS Cal/Val Cruises Workshop

VCC Colwood

This is a working group meeting for the PIs of the NOAA VIIRS Cal/Val Team and PIs and participants of the NOAA VIIRS Cal/Val Cruises (2014, 2015 and 2016). The NOAA/STAR ocean color team is focused on "end-to-end" production of high quality "fit for purpose" satellite ocean color products required for NOAA applications and expected by the international ocean color community. In situ validation of satellite data is an essential component in this process. The NOAA VIIRS Cal/Val Team collaborates on field projects and supports platform-based observations. By the time of Ocean Optics XXIII, three dedicated ocean color validation cruises in support of JPSS VIIRS on SNPP will have been completed aboard the NOAA Ship Nancy Foster. The November 2014 cruise covered the mid-Atlantic US coast and the December 2015 cruise covered the south-Atlantic US coast and the Tongue of the Ocean in Bahamian waters. Collaborators include those from other US Government institutions (NRL, NASA, NIST), at least five US universities and an international institution (JRC). The 2016 cruise is being planned for October. NOAA/STAR looks forward to annual ocean color validation cruises in support of JPSS VIIRS on SNPP, J-1, J-2 and other forthcoming satellite ocean color missions from the US as well as other countries. We also look forward to working with the US and the international ocean community to use in situ data and satellite ocean color products for improving our understanding of global ocean optical, biological, and biogeochemical properties. This is a working group meeting specifically intended for the PIs of the NOAA VIIRS Cal/Val Team and PIs and participants of the NOAA VIIRS Cal/Val Cruises. Others who may be interested in attending are asked to please contact Veronica Lance (Veronica.Lance@NOAA.gov)

# Wednesday 10/26

6:30 pm – 7:45 pm

### TOWN HALL » Satellite Phytoplankton Functional Type Algorithm Intercomparison

VCC Sidney

Phytoplankton community structure influences marine ecology and biogeochemistry. Its importance has been recognized by both the oceanographic and earth science communities (e.g. for carbon and nitrogen cycles, and biodiversity). Ocean-colour remote sensing is a key method to observe marine biology from satellite, and various approaches have been developed to derive multiple phytoplankton groups using ocean colour. Following an initial algorithm intercomparison, focused on detecting the dominant phytoplankton group, the Satellite Phytoplankton Functional Type Intercomparison Project was set-up to: (1) develop a user guide for algorithms; (2) develop a comprehensive in situ dataset for the algorithm intercomparison; (3) intercompare output from global algorithms; and (4) validate algorithms using the in situ dataset. The project is currently starting on the validation (4). In this meeting, we discuss: (i) the status of the intercomparison project, (ii) our approach to the validation and initial results; and (iii) an ensemble approach towards "a community dataset" of multiple phytoplankton groups using multiple algorithms. Not only algorithm developers but anyone interested in the topic is welcome at the meeting. Please contact Lesley Clementson (lesley.clementson@csiro.au) for more information.

6:30 pm – 7:45 pm

### TOWN HALL » Benefits and Challenges of Geostationary Ocean Colour Remote Sensing - Science and Applications

VCC Theatre

Ocean color (OC) remote sensing from geostationary orbit (geo) provides the capability of high temporal resolution measurements (e.g., <hourly) that can revolutionize the scientific application and societal value of OC data from space. This capability is necessary to study nearshore waters where the physical, biological and chemical processes react on short time scales, and apply observations to monitor coastal water quality indicators, detect and track coastal hazards, and improve assimilation of satellite data into operational models. The objectives of this breakout session are to discuss (1) the unique science and applications value of OC observations from a geo-orbit; (2) the advantages of geostationary OC in combination with OC from polar orbiting sensors and the minimum set of requirements to achieve a quasi-global geostationary OC constellation; (3) key issues to resolve for successful application of geostationary OC data including atmospheric correction, sun-earth-sensor geometry, BRDF, sensor pointing stability, etc.; (4) the processes and new products possible from geostationary orbit including the challenges in reducing uncertainties to take full advantage of the high temporal resolution; and (5) receive input from the ocean optics community on the measurement and instrument requirements and other potential applications. Contact Maria Tzortziou (mtzortziou@ccny.cuny.edu) for more information.

3:15 pm – 4:30 pm

### TOWN HALL » Arctic COLORS

VCC Sidney

Arctic-COLORS (Arctic - COastal Land Ocean inteRactions) is a Field Campaign Scoping Study supported by NASA's Ocean Biology and Biogeochemistry (OBB) Program that aims to quantify present and future impacts of changing land and ice on marine net ecosystem productivity in the fastest warming environment on the planet: the Arctic. A Science Plan is under development that describes and justifies the design of an integrative, interdisciplinary program that will combine detailed process studies, field surveys, advanced modeling tools, and enhanced remote-sensing retrievals from various platforms (ship-based, airborne, and space-based) to study the coastal Arctic as an integrated land-ocean-atmosphere-biosphere system.

An update on the status of the scoping study will be presented with Q&A and community input to follow. During this Town Hall we will discuss (1) the revised top level science questions, (2) the new study domain for Arctic-COLORS, (3) the challenges for ocean color in the coastal Arctic, and (4) the needs for new remote sensing approaches and capabilities for assessing the impacts of natural and anthropogenic changes on coastal Arctic ecology and biogeochemistry. Please contact Antonio Mannino (antonio.mannino-1@nasa.gov) for more information.

3:15 pm – 4:30 pm

### TOWN HALL » HyspIRI: New and Future Activities and Opportunities in Coastal and Inland Aquatic Hyperspectral Remote Sensing

VCC Theatre

The Hyperspectral Infrared Imager (HyspIRI), a future NASA mission that would globally image the Earth's coastal and inland aquatic systems at 30-meter spatial resolution using a spectrometer with a spectral range between the UV to the shortwave infrared (0.38-2.5µm) and spectral resolution of 10 nm. HyspIRI also includes a 60-meter spatial resolution thermal imager with 8 bands. In polar orbit, HyspIRI would provide unprecedented global observations of coastal and inland aquatic habitats and ecosystems, such as coral reefs, sea grass meadows, kelp forests, marshes and mangroves. At this town hall, we will provide an update on: the HyspIRI mission; current and upcoming funded activities and future opportunities; and new data that will facilitate the development and validation of hyperspectral coastal and inland aquatic remote sensing algorithms and techniques. We will also set aside time for a public dialogue regarding the future of aquatic hyperspectral coastal and inland aquatic remote sensing to provide feedback to the Decadal Survey process. Please contact Kevin Turpie (Kevin.R.Turpie@nasa.gov) for more information.

4:45 pm – 6:00 pm

### TOWN HALL » Priorities of Ocean Optics Research in a Changing Arctic

VCC Sidney

The Arctic Ocean is in rapid change, summer loss of sea ice has widespread effects on the light climate in the Arctic Ocean, which in turn will affect ocean heating, primary production and biogeochemical cycles. The reduced ice cover promotes the use the remote sensing techniques and use of autonomous and remotely operated vehicles as observation tools for observation of complex physical and bio-optical phenomena. The Arctic Ocean receives a disproportionally large terrestrial discharge, which is expected to increase in future. The runoff carries a significant amount of optically active materials (dissolved and particulate) which will impact the biogeochemistry of Arctic Ocean shelf margins. The timing and extent of summer sea ice melt will impact the sympagic algae communities in both coastal and pelagic ocean. Optical instrumentation, which is easy to deploy on various platforms, offers a cost efficient method to observe for linkages between physical variables and biological and biogeochemical processes. Thus the ocean optics research community is at the forefront to be able to contribute to the understanding of the impacts of ongoing changes, which will also have significant societal implications. This Town-Hall invites the broader marine optics research community to share information about ongoing activities, provide a platform to coordinate activities across observationalists, modelers and ocean color researchers, to identify the most critical questions that should be addressed in ongoing and future research programs in the near-future. Two 15-minute presentations have been scheduled:

1. Victoria Hill, "Utility of autonomous measurements for observation of Arctic Ocean optical properties"
2. Atsushi Matsuoka, "Ocean colour remote sensing of the Arctic Ocean"

This event will also include an overview of the CDOM-Heat project funded by the Polish-Norwegian Research Program. Contact Piotr Kowalczuk (piotr@iopan.gda.pl) for more information.

4:45 pm – 6:00 pm

### TOWN HALL » Sentinel-3 Update

VCC Theatre

The Sentinel-3A satellite was launched in February 2016 as a first in the series of European Commission's Copernicus Programme satellites primarily dedicated to the study of the oceans. Sentinel-3A has hence initiated decades of operational ocean colour data services. Ocean and Land Colour Instrument (OLCI), with a heritage in ENVISAT's MERIS, is already providing high quality ocean colour data to expert users for validation. The mission's five-month commissioning phase is now completed and the processes of product validation and ramping up the ground segment are ongoing.

The Town Hall will discuss OLCI radiometric, spectral and geometric performance and Level-1 product quality achieved thanks to intense activities conducted during the commissioning phase. Initial evaluations of Level-2 ocean colour products will also be presented based on agency activities and feedback from independent experts within the Sentinel-3 Validation Team (S3VT). The Town Hall will review Sentinel-3 marine data services, which include different options for accessing data and information, and will give the opportunity to answer questions and gain feedback. OLCI algorithm and product evolution plans will be discussed. The Copernicus Marine Environment Monitoring Service (CMEMS) and its Ocean Colour Thematic Assembly Centre (OC-TAC) is the operational recipient of OLCI products. CMEMS has been developing operational marine services based on OLCI data and will be the host of higher level ocean colour and biogeochemistry products. Please contact Ewa Kwiatkowska (ewa.kwiatkowska@eumetsat.int) and Marc Bouvet (marc.bouvet@esa.int) for more information.