Workshop for Remote Sensing of Coastal and Inland Waters
University of Wisconsin-Madison
Engineering Centers Building, Room 1025
(1550 Engineering Drive, Madison, WI 53706)

Research Questions

1. What products can be retrieved in coastal and inland water bodies and what are the associated uncertainties with these products across many environmental conditions?
2. Do current atmospheric correction and bio-optical inversion schemes work adequately in coastal and inland regions?
3. What variability or deviation is observed in the relationships of optical and biogeochemical properties from those that have been established for the continental shelf or open ocean water?
4. What scales of variability (spatial, temporal, spectral) are able and not able to be captured with current and planned satellite missions?

DAY 1 (June 20)

8:00 am – Arrival and greeting
8:15 am – Welcome, overview of workshop and logistics (Colleen Mouw and Steve Greb)

I. Remote Sensing Products and Missions: *synthesis of where we've been, where we are and where we are going: missions (airborne & space borne), instruments, products; maturity and availability*

II.

8:30 am (20 min) – U.S. aquatic color overview (Steve Lohrenz)
8:50 am (20 min) – U.S. temperature overview (Simon Hook)
9:10 am (45 min) - International perspectives, activities, initiatives (Tiit Kutser, Arnold Dekker, and Carsten Brockmann)

9:55 am (15 min) – Break

10:10 am (80 min) - Mission Panel (8 min each, Ignite format)
Overview of capability and a few examples of how these sensors have been used in coastal and inland waters.
SeaWiFS/MODIS (Chuanmin Hu)
MERIS (Carsten Brockmann)
HICO (Nick Tufillaro)
Landsat (John Schott)
ASTER (Simon Hook for Michael Abrams)
PACE/ACE (Menghua Wang)
HyspIRI (Simon Hook)
GEO-CAPE (Colleen Mouw)
Upcoming European missions, Sentinel, others? (Carsten Brockmann)

11:30 am (30 min) – Questions and Discussion

12:00 pm (75 min) – Lunch

II. Algorithm Approaches: *Synthesis, examples, deficiencies, uncertainty and future needs*

1:15 pm (20 min) – Semi-analytical optical algorithm overview (Zhongping Lee)
1:35 pm (20 min) – Empirical optical algorithm overview (Wes Moses)
1:55 pm (20 min) - Temperature algorithm overview (Chris Wilson)
2:15 pm (30 min) - Atmospheric Correction (Menghua Wang)
2:45 pm (15 min) - Challenges (land effects, shallow water, etc.) (Arnold Dekker)

3:00 pm (15 minute) – Break

3:15 pm (70 min) – Algorithm/Application Panel (5 minutes each, Ignite format)
Brief overview of objectives, findings, constraints, and next steps. Highlight success and problems to help stimulate discussion.
Coastal Ocean
Turbid waters – Amazon (Maycira Costa)
Shallow Ecosystems – Coral Reefs (Gerardo Toro-Farmer)
Chlorophyll patterns (Alex Gilerson)
Chlorophyll (John Schalles)
Bathymetric mapping (Hongxing Liu)
Great Lakes
Great Lakes Coastwatch/Operational Imagery (George Leshkevich)
Great Lakes Algorithms (Bob Shuchman and George Leshkevich)
Algal Blooms (Caren Binding)
Aircraft Sensing of Microcystis (Richard Beck)
Great Lakes Primary Production (Steve Lohrenz)
Inland Lakes
Minnesota Lakes (Leif Olmanson)
Oregon Lakes (Nick Tufillaro)
Inland WQ and Climate Change (Kaishan Song)
Eutrophic Lakes (Ronghua Ma)

4:25 pm – Group Discussion
5:00 pm (10 min) – Group Photo
5:10 pm (60 min) – Poster Presentations
6:30 pm – Group Dinner

DAY 2 (June 21)
8:15 am – Arrival

III. Relationships *between optical, biogeochemical, biological and ecological properties*
8:30 am (25 min) – visible overview (Susanne Craig)

8:55 am (40 min) - Relationships Panel (5 minutes each, Ignite format)
Brief overview of objectives, findings, constraints, and next steps
CDOM (Tiit Kutser)
CDOM (Patrick Brezonik)
Non-algal Particles (Maycira Costa)
Minerogenic Optics (Bob Stavn)
Chlorophyll (Wes Moses)
HABs (Caren Binding)

Primary Production (John Marra)
CO_2 (Alec Wang)

IV. *In situ* Data Availability and Needs: *data archives and repositories, current parameters routinely observed, technology enabling observations for the future, validation*.

9:35 am - Data panel (15 min each region)

a) Coastal Ocean (Ru Morrison and Doug Wilson)
b) Great Lakes (David O'Donnell)
c) Small Lakes (Tiit Kutser)

10:20 am (25 min) – Questions and Discussion

10:45 am (15 min) – Break

11:00 am (15 min total) - Data repositories
Optics: NASA SeaBASS (3 min) (Colleen Mouw)
Temperature Consortia, GHRSST (12 min) (Simon Hook)

11:15 am (15 min) – Polarization Sensitive Instruments (Alex Gilerson)
11:30 am (30 min) - Sensor Technology (Mike Twardowski)

12:00 pm (75 min) - Lunch

V. Scales of Variability (temporal/spatial/spectral): *Natural variability of the system and what capability is needed to observe this.*

1:15 pm (30 min) - Shortcomings & needs overview (Dirk Aurin, Chuanmin Hu and Zhongping Lee)

VI. End Users: *Agency perspectives, linkages between producers and users, training/education*

1:45 pm (45 min, approx. 8 min each) - User Needs Panel
NOAA (Paul DiGiacomo)
EPA (Blake Schaeffer)
State agencies (Steve Greb)
Environment Canada (Caren Binding)
CSIRO (Arnold Dekker)

2:30 pm (30 min) – Break

VII. Challenges and Future Plans

3:00 pm (2 hours) – Breakout Discussions

1) Algorithms and uncertainty (Questions 1 & 2)
2) Relationships, observations, scales of variability (Questions 3 & 4)
3) Others?

5:00 pm (60 min) – Poster Presentations
6:00 pm – Optional Group Events

1) Beer and live music at the Memorial Union Terrace (http://www.union.wisc.edu/venue-muterrace.htm)
2) Independently organized small group dinners

DAY 3 (June 22)

8:15 am – Arrival

VII. Priorities for the Future: *Filling gaps in knowledge; ensuring coastal and inland waters are fully enabled in forthcoming missions. What planning is going on at NASA and international space agencies? Inventory of capabilities.*

8:30 am (20 min) – Synthesis of workshop and overview of objectives (Colleen Mouw)
8:50 am (60 min) - Report out from breakout discussions (Schaeffer) (Dekker)
9:50 am (120 min) – Discussion

12:00 pm – Adjourn, lunch on your own

1:00 pm – Further discussion and white preparation (for those remaining in town)

5:30 pm – Gathering at Steve Greb's home (for those still in town)