Integrated Trends Analysis Team (ITAT)

Wednesday, August 27th, 2025

10:00 AM – 11:30 PM

Join by Webinar (Microsoft Teams)

Meeting Link

Meeting Number: 258 013 106 426

Password: i4ip9q

Or join by phone

Conference Line: +1 469-208-1525

Access code: 292 973 256#

Meeting Materials: Link

This meeting will be recorded for internal use only to assure the accuracy of meeting notes.

Closed Captioning will be available for this meeting. To turn on the closed captioning, click on the 3 ellipses (More actions), then click on "Turn on live captions" (preview).

*Important Security Note **(please read)**: Due to enhanced meeting security practices, **all meeting attendees' cameras and microphones will be disabled at the start of the meeting.** To request access to the microphone and camera, use the raised hand feature on Teams. We will then enable you to unmute your mic and turn on your camera. Once a participant has microphone or camera access, they will have this permission for the remainder of the meeting. Access to chat will be allowed for all participants.*

If the meeting's privacy is compromised, the meeting staffer and coordinator will end the meeting and send an email to all members and interested parties with a new meeting link. Please share this with colleagues attending the meeting who may not be on the distribution list, but do NOT share this link publicly or post it to the Chesapeakebay.net webpage.

AGENDA

10:00 – 10:05 AM *Welcome* – *Breck Sullivan (U.S. Geological Survey, USGS) and Kaylyn Gootman (Environmental Protection Agency, EPA)*

Announcements:

- Newly published Potomac Tributary Summary Report! You can access the report on the ITAT Tributary Summaries Project webpage here.

Conferences:

- Coastal & Estuarine Research Federation (CERF) 28th Biennial Conference, November 9-13th, 2025. Richmond, VA. ***Registration is now open!***
- Alliance for the Chesapeake Bay – Chesapeake Watershed Forum, November 7-9, 2025. National Conservation Training Center, Shepherdstown, WV. ***Proposal for Posters now open!***

10:05 – 10:45 AM *Hypoxia Forecasting for Chesapeake Bay Using Artificial Intelligence, Artificial Intelligence for the Earth Systems*

Presenter(s): *Guangming Zheng (University of Maryland, UMD)*

Description: The abstract for Guangming Zheng's recent publication [link] follows: Seasonal hypoxia is a recurring threat to ecosystems and fisheries in the Chesapeake Bay. Hypoxia forecasting based on coupled hydrodynamic and biogeochemical models has proven useful for many stakeholders, as these models excel in accounting for the effects of physical forcing on oxygen supply, but may fall short in replicating the more complex biogeochemical processes that govern oxygen consumption. Satellite-derived reflectances could be used to indicate the presence of surface organic matter over the Bay. However, teasing apart the contribution of atmospheric and aquatic constituents from the signal received by the satellite is not straightforward. As a result, it is difficult to derive surface concentrations of organic matter from satellite data in a robust fashion. A potential solution to this complexity is to use deep learning to build end-to-end applications that do not require precise accounting of the satellite signal from the atmosphere or water, phytoplankton blooms, or sediment plumes. By training a deep neural network with data from a vast suite of variables that could potentially affect oxygen in the water column, improvement of short-term (daily) hypoxia forecast may be possible. Here, we predict oxygen concentrations using inputs that account for both physical and biogeochemical factors. The physical inputs include wind velocity reanalysis information, together with 3D outputs from an estuarine hydrodynamic model, including current velocity, water temperature, and salinity. Satellite-derived spectral reflectance data are used as a surrogate for the biogeochemical factors. These input fields are time series of weekly statistics calculated from daily information, starting 8 weeks before each oxygen observation was collected. To accommodate this input data structure, we adopted a model architecture of long short-term memory networks with eight time steps. At each time step, a set of convolutional neural networks are used to extract information from the inputs. Ablation and cross-validation tests suggest that among all input features, the strongest predictor is the 3D temperature field, with which the new model can outperform the state-of-the-art by ∼20% in terms of median absolute error. Our approach represents a novel application of deep learning to address a complex water management challenge.

10:45 - 11:30 PM *RIM Loads and Trends Through Water Year 2024*

Presenter(s): *James Webber (USGS).*

Description: Presenters will provide updated nitrogen, phosphorus, and suspended-sediment loads, and changes in loads, in major rivers across the Chesapeake Bay Watershed that were calculated using monitoring data from the Chesapeake Bay River Input Monitoring (RIM) Network stations for the period between 1985 through 2024. You can find the full data release here.

11:30 PM Adjourn

Next Meeting: Wednesday September 24th, 2025, from 10 AM – 12 PM