

Joint Organized by  
The International Association for Hydro-Environment Engineering & Research (IAHR) Hong Kong Chapter

## SEMINAR

# MODELING THE WATER QUALITY IMPACTS OF THE ECOLOGICAL SEPARATION OF THE GREAT LAKES AND MISSISSIPPI RIVER BASINS AT CHICAGO FOR INVASIVE SPECIES CONTROL

### Speaker

**Prof. Charles S. Melching**

**Department of Environmental Engineering and Science  
Macau University of Science and Technology**

### Abstract

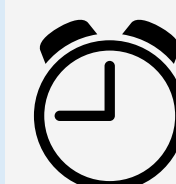
In 1900, the Chicago Sanitary and Ship Canal (CSSC) was opened to reverse the flow of the Chicago River diverting the wastewater from Chicago away from Chicago's water source, Lake Michigan, and toward the Mississippi River. This project has been a great public health success for Chicago, but in the later 20th Century the CSSC and other waterways of the Chicago Area Waterways System (CAWS) became a conduit for invasive species to move between the Great Lakes and Mississippi River basins. The U.S. Army Corps of Engineers evaluated methods to prevent the migration of invasive species between the Great Lakes and Mississippi River basins particularly in the Chicago metropolitan area in the Great Lakes and Mississippi River Interbasin Study (GLMRIS). The DUFLOW modeling system developed in the Netherlands has been adapted to simulate water quality in the CAWS. This model was applied to consider Current (actual inflows in the test water years), Baseline (inflows changed to reflect facilities expected to be operational in 2017), and Future (inflows changed to reflect facilities expected to be operational in 2029) in the CAWS for no separation, lakefront separation, or mid-system separation project conditions. This presentation discusses the changes in dissolved oxygen (DO) concentrations and in compliance with DO standards in the CAWS resulting for the various projects and flow conditions. Three representative water years, a wet year (2008), dry year (2003), and medium year (2001), are considered to compare the DO results from no project and those resulting for the various ecological separation scenarios. How this water quality simulation results affected the final project selection also is discussed along with the current status of the GLMRIS project.

### Biography

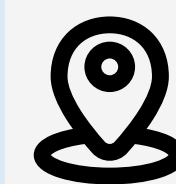
Charles S. "Steve" Melching, Ph.D., P.E., F.ASCE, D.WRE, BCEE is an environmental consultant from Greenfield, Wisconsin, U.S. and a Visiting Professor at the Department of Environmental Engineering and Science, Macau University of Science and Technology. In his 35+ year career he has been a Professor of Civil and Environmental Engineering at Marquette University and Rutgers University and a Hydrologist with the U.S. Geological Survey. He has worked on a wide variety of hydrologic and water quality studies in Illinois, Wisconsin, Arizona, Arkansas, Florida, Kentucky, Massachusetts, Minnesota, New Jersey, North Dakota, Oklahoma, Oregon, Tennessee, Belgium, Canada, and China. He has received the 2001 ASCE Huber Civil Engineering Research Prize and the 2008 Researcher of the Year Award from Marquette University. He is an Associate Editor of the International Journal of Sediment Research and of Water Science and Engineering. He is the co-author of five books and has authored more than 100 journal articles, conference papers, book chapters, and technical reports.



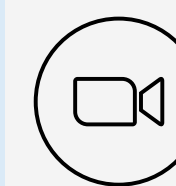
**22 March 2024  
Friday**



**3:00 pm - 4:00 pm**



**Room 3598 (Lift 27/28),  
HKUST**



**Zoom Link**  
**Meeting ID: 967 6515 4910**  
**Passcode: 503792**

### Enquiry:

Ms. Rebecca Yau  
cerebeca@ust.hk