MISSISSIPPI STATE UNIVERSITY
WATER RESOURCES RESEARCH INSTITUTE

MWRRI E-Newsletter

MWRRI E-Newsletter **Spring 2018**

From the Director's Desk …

It's hard to believe that a school year has already passed since I became the Institute Director. These are certainly busy times! Last month's statewide water resources conference, hosted by MWRRI, affirmed continued interest in water resources research and management in Mississippi evidenced by the quality of presentations and number of participants. Our numbers were up significantly over the past several years. I'd like to especially thank our event sponsors and exhibitors: Mississippi Farm Bureau Federation, Mississippi Soil and Water Conservation Commission, Mississippi Water Resources Association, Yazoo-Mississippi Delta Levee Board, Neel-Schaffer, Inc., Pickering Firm, Inc., and Weyerhaeuser Company. Additional thanks to the Mississippi Department of Environmental Quality (MDEQ) and U.S. Geological Survey (USGS) for their assistance with conference planning, our plenary speakers, and to all of our technical session facilitators who identified and solicited speakers for their sessions. Reports on the conference and a profile on Dr. Xiaobo Chao, Senior Research Scientist for the National Center for Computational Hydroscience and Engineering with the University of Mississippi, are featured in this e-newsletter.

As we approach the summer, we are now assisting the Mississippi Agriculture & Forestry Experiment Station (MAFES) and other partners with putting into action the Implementation Plan for the Catalpa Creek Watershed – Phase 1 for which we received funding this spring from MDEQ and USEPA, finalizing our 2018 USGS 104b awards, preparing for our May 31-June 1 Civic Engagement Workshop in Biloxi with invited participants from across the Mississippi River/Gulf of Mexico Watershed, drafting a 5-year work plan to continue our role as a designated Center of Excellence for Watershed Management by MDEQ and USEPA Region 4, preparing project concepts for a number of potential projects, and numerous other activities.

Wishing you an enjoyable and productive summer,

Jason

Jason Krutz, Ph.D.

2018 Mississippi Water Resource Conference

April 3-4, 2018

The annual Mississippi Water Resources Conference, hosted by MWRRI, was held at the Jackson Hilton on April 3-4, 2018. There were 172 participants in the conference, including 33 students. Researchers and students from colleges and universities as well as water resources planners, managers, and policy-makers from state and federal agencies, industry, and other backgrounds presented 56 oral presentations during 14 technical sessions on the following topics:

- Coastal Issues
- Measurements and Mechanisms for Earthen Levee and Gully Erosion
- Streamflow Alteration Assessments to Support Bay and Estuary Restoration in Gulf States
- BMP Effectiveness
- Challenges to Establishing Targets and Practices for Managing Nutrients in Delta Waterbodies
- Streamflow & Sedimentation
- Irrigation Efficiency and Conservation
- Surface Water – Groundwater Interaction
- Water Treatment
- Groundwater Availability in the Mississippi River Alluvial Plain
- Reservoirs & Streams
- Management of Water Resources in Mississippi

Additionally, 21 posters were presented informally during a welcome reception held at the end of the day Tuesday. The reception also provided opportunities for conference participants to network over hor d'oeuvres and refreshments.

The conference was convened by Dr. Jason Krutz, who welcomed this year's participants and provided an overview of the conference plenary and technical sessions. Tuesday's lunch plenary featured Jimmy Palmer, J.D., P.E., and Bennett Bearden, J.D., who presented "Who's on first? The status of water policy in Mississippi and Alabama." The presentation began with an entertaining video featuring the acclaimed 1953 Abbott and Costello comic routine "Who's on first?" Wednesday's plenary featured Dr. Ron Cossman, Social Science Research Center, and Abby Braman, Pearl Riverkeepers, who presented "How important are stakeholders and can their impacts be measured."

Again this year, students had opportunities to be involved in both an oral and/or poster presentation competition. Through sponsorship of Weyerhauser and an an anonymous gift, cash prizes of $150 for 1st place, $100 for 2nd place, and $50 for 3rd place were awarded to the winners in both categories.

Winners of the Student Oral Presentation Competition were:

1st Place — Catie Dillon, Agriculture & Biological Engineering, Mississippi State University, "Examining the Effects of Directional Wave Spectra on a Nearshore Wave Model"

2nd Place — Gray Turnage, Plant & Soil Sciences, Mississippi State University, "Chemical Control of the Floating Aquatic Plant Common Duckweed (*Lemna minor L.*) and Watermeal (*Wolffia spp.*)"

3rd Place — James Grafe, Civil and Environmental Engineering, Mississippi State University, "Understanding Relations between Streamflow, Turbidity, and Suspended-Sediment Concentration in an Impaired Mississippi Stream"

Winners of the Student Poster Competition were:

1st Place — Alexandra Firth, Wildlife, Fisheries, and Aquaculture, Mississippi State University, "Ecological Agriculture Application with Winter Flooding"

2nd Place — Tadesse Sinshaw, University of Mississippi, "A Spatial Decision Support System for Choice and Placement of Nitrogen Source Reducing Best Management Practices in the Beasley lake Watershed, Delta Region of Mississippi"

3rd Place — Natasha Drotar, Department of Forestry, Mississippi State University, "Effects of Prescribed burning on Canopy Structure and Water Partitioning in an Upland Oak Forest"

The Institute would like to thank our sponsors and exhibitors this year:

Sponsors

- Mississippi Farm Bureau Federation
- Mississippi Farm Bureau Federation
- Pickering Firm, Inc.
- Weyerhaeuser Company

Exhibitors

- Mississippi Soil and Water Conservation Commission
- Neel-Schaffer, Inc.
- Mississippi Water Resources Association

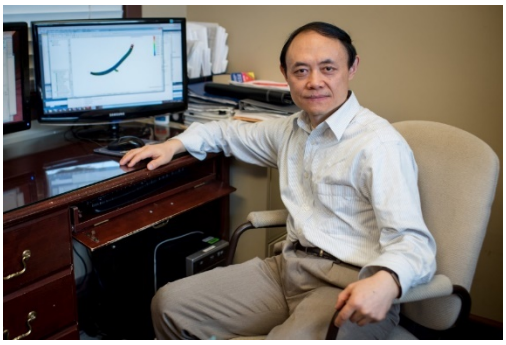
- Yazoo-Mississippi Delta Levee Board

Special thanks to the Mississippi Department of Environmental Quality and U.S. Geological Survey for their assistance with conference planning, and to all of our technical session facilitators/coordinators who identified and solicited speakers for their sessions. Finally, all the successes of our conference were a product of the long hours and hard work of Ms. Jessie Schmidt, Coordinator of MWRRI and Mr. Richard Ingram, MWRRI's Associate Director.

A short attendee survey will be distributed for responses to topics and location. We hope everyone had an enjoyable time in Jackson and we hope to see you again next year for the 2019 Mississippi Water Resources Conference.

Researcher Profile:
Xiaobo Chao, Ph.D., Senior Research Scientist, National Center for Computational Hydroscience and Engineering, University of Mississippi

Tell us a little bit about your background and your current position.



I obtained my Ph.D. in Civil Engineering from Sichuan University in China. After receiving my Ph.D., I worked at the State Key Laboratory of Coastal & Offshore Engineering, Dalian University of Technology, as a postdoctoral fellow for two years. Subsequently, I joined the National University of Singapore as a NSTB Postdoctoral Fellow and Research Fellow. I moved to the USA and joined National Center for Computational Hydroscience and Engineering (NCCHE) in Aug. 2001. I am currently a Senior Research Scientist at NCCHE.

As a scientist, I have developed several numerical models, including a CCHE water quality model and pollutant transport model, a 3D multi-level turbulence tidal model, and an oil spill model. As a PI, Co-PI and Co-I, I have participated in various research projects sponsored by NSF, USGS, MWRRI, DHS, ARS, and other federal and local agencies. I have published over 80 journal and conference papers. I am currently a member of ASCE, IAHR, and ASCE EWRI TMDL Analysis & Modeling Task Committee.

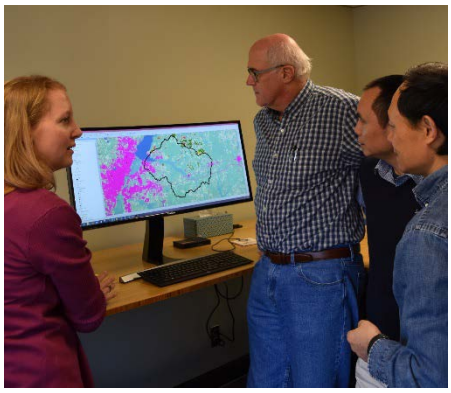
In addition, I also offer the course “Numerical Modeling of Water Quality and Pollutant Transport” for graduate students in the University of Mississippi and Chongqing Jiaotong University. I am a reviewer for various international journals including Journal of Hydraulic Engineering, Journal of Environmental Engineering, Journal of Hydraulic Research, Advances in Water Resources, Ecological Modeling, Journal of Environmental Management, and others.

What are your current research activities and interests?

My research interests are focused on the field of Environmental Hydraulics and Computational Hydraulics, with special emphasis on modeling of hydrodynamics, water quality, chemical and oil spills, sediment transport and environmental risk analysis for lakes, rivers, and coastal waters. In recent years, some of the research project in which I have participated include:

1. Study of Sediment and Nutrients in Pelahatchie Bay and Upland Mill-Pelahatchie Creek-Watershed (PI: Dr. Xiaobo Chao, Sponsor: MWRRI and USGS)

This project studies the response of water quality in a Mississippi reservoir to incoming sediment and pollutant loads from upland watersheds. As the PI of this project, I am responsible for the overall project administration and development of a 3D receiving water model. This model has been developed and applied to simulate the distributions of sediment and nutrients in Pelahatchie Bay based on upland loads simulated using AnnAGNPS model. The effectiveness of implemented BMPs in the upland watershed on the reservoir water quality will be evaluated using the developed modeling system.



2. Interdisciplinary Assessment of Mercury Transport, Fate and Risk in Enid Lake, Mississippi (PI: Dr. Xiaobo Chao, Sponsor: MWRRI and USGS)

This project studies the mercury levels in water, sediment and several species of fish in Enid Lake based on field measurement, numerical model and remote sensing imagery. As a PI of this project, I have developed a numerical model to simulate the mercury concentration in Enid Lake. It has been found that the major sources of mercury in Enid Lake are the loads of river inflow from upstream Yocona River, runoff from surrounding watersheds, and atmospheric deposition. Mercury is generally absorbed on sediment and introduced to the lake due to the transport of sediments, therefore, the concentrations of mercury are generally higher near the Yocona River mouth compared to the deeper water areas near the dam. The measured data shows that the Hg concentration in Large Bass Mouth from Enid Lake exceeds the maximum concentration of 300 ng/g allowed by the EPA.

3. Computational Tools and a Decision Support System for Management of Sediment and Water Quality in Agricultural Watersheds (PI: Dr. Yafei Jia, Sponsor: U.S. Department of Agriculture)

The overall goal of this project is to provide improved, state-of-the-art one-, two-, and three- dimensional predictive modeling capabilities (CCHE1D, CCHE2D and CCHE3D) to: model soil erosion, sediment transport, local scouring, earth embankment breaching, flooding event, agro-contaminant transport and water quality processes. I have been working on this project for more than 10 years and have developed CCHE water quality and pollutant transport model. This model can be applied to simulate the phytoplankton

kinetics, nitrogen cycle, phosphorus cycle, and dissolved oxygen balance in both the water column and sediment layer. The sediment associated water quality processes have been included. This model can also be applied to simulate the chemical contaminates in the water column and bed sediment layers. A graphic user interface (GUI) has been developed to operate this model, including simulation option, data inputs, model running, and outputs visualization.

How does the Water Resources Research Institute fit into your future plans? How can we help you be successful?

The MWRRI is one of the important supporters of my research and professional development. I have received awards for two projects sponsored by MWRRI. With those funds, I have been able to expand my research interests and collaborate with other scientists, which will help me with other funding applications. In addition, MWRRI sends us very valuable information regarding grants, research studies, publications, conferences, etc., which has been greatly beneficial to my research. As a scientist, seeking funding is the most important task in our professional career. I will be extremely grateful if MWRRI is able to create more funding sources and collaboration opportunities for university researchers.

About the Mississippi Water Resources Research Institute (MWRRI)

The institute exists as both a federal and a state research unit. Established in 1964, the MWRRI is one of 54 institutes (one in each state, The District of Columbia, Guam, Puerto Rico, and the Virgin Islands) that form a national network to solve water problems of state, regional, or national significance. In 1983, the Mississippi legislature formally designated the MWRRI as a state research institute. Federal funds designated for the institute are used to consult with state water officials to develop coordinated research, technology transfer and training programs that apply academic expertise to water and related land-use problems. These various activities are funded through an annual grant from the United States Geological Survey (USGS). Mississippi state appropriations provide additional funds for cost share. The institute also assists state agencies in the development of a state water management plan, maintaining a technology transfer program, and serves as a liaison between Mississippi and federal funding agencies.

If you or someone that you know would like to receive this publication please email jessie.schmidt@msstate.edu to be added to the MWRRI listserv.

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