

Ehab A. Meselhe  
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School of Science and Engineering

### **EDUCATION**

B.S., Zagazig University, Egypt (1987), M.S., University of Iowa (1991), Ph.D., University of Iowa (1994)

### **OFFICE**

Lindy Boggs Center 627 (Uptown)  
Tulane University  
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### **BIOGRAPHY**

Ehab Meselhe, Ph.D., P.E., is Professor in the Department of River-Coastal Science and Engineering at Tulane University. Dr. Meselhe has more than 25 years of experience researching coastal wetland hydrology, sediment transport, and computer modeling of coastal wetland, estuarine, and riverine systems. He worked as an educator, researcher, and practitioner with extensive experience working with academic institutions, government agencies, and the private sector. Dr. Meselhe served as Louisiana's technical lead for the Mississippi River Hydrodynamic and Delta Management Study and helped build the numerical models that provided a foundation for Louisiana's 2012 and 2017 Coastal Master Plans. Dr. Meselhe is heavily involved in the numerical modeling being used by Louisiana to help refine the design of sediment diversions at Mid-Barataria and Mid-Breton along the Mississippi River.

Dr. Meselhe is a registered Professional Engineer in the states of Iowa and Louisiana. He also served as an Associate Editor of the Journal of Hydrology (Elsevier), and the Journal of Hydraulic Research (International Association of Hydraulic Research).

### **SELECTED PUBLICATIONS**

White, E. D., Reed, D. J., and Meselhe, E. A. (2019). Modeled sediment availability, deposition, and decadal land change in coastal Louisiana marshes under future sea level rise scenarios. *Wetlands*. 1-16. <https://doi.org/10.1007/s13157-019-01151-0>

Vaccare, J., Meselhe, E.A., and White, J. R. (2019) "The denitrification potential of eroding wetlands in Barataria Bay, LA, USA: Implications for river reconnection," *Science of The Total Environment*, Volume 686, Pages 529-537, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2019.05.475>.

Baustian, M.M., Meselhe, E.A., Jung, H., Sadid, K., Duke-Sylvester, S.M., Visser, J.M., Allison, M.A., Moss, L.C., Ramatchandiran, C., van Marend, D.S., Jeukens, M., Bargu, S. (2018) "Development of an Integrated Biophysical Model to represent morphological and ecological processes in a

- changing deltaic and coastal ecosystem," *Environmental Modelling & Software*, vol. 109, pages 402-419, <https://doi.org/10.1016/j.envsoft.2018.05.019>
- Reed, D., van Wesenbeeck, B., Herman, P.M.J. and Meselhe, E.A. (2018) "Tidal Flat-wetland Systems as Flood Defenses: Understanding Biogeomorphic Controls," *Estuarine, Coastal and Shelf Science*, vol. 213, pages 269-282, ISSN 0272-7714, <https://doi.org/10.1016/j.ecss.2018.08.017>.
- White, E.D., Messina, F., Moss, L. and Meselhe, E.A. (2018) "Salinity and Marine Mammal Dynamics in Barataria Basin: Historic Patterns and Modeled Diversion Scenarios," *Water*, 10, 1015; doi: 10.3390/w10081015.
- Gaweesh A. and Meselhe, E.A. (2018) "Closure to "Evaluation of Sediment Diversion Design Attributes and Their Impact on the Capture Efficiency," *Journal of Hydraulic Engineering*, 144 (8), [https://doi.org/10.1061/\(ASCE\)HY.1943-7900.0001114](https://doi.org/10.1061/(ASCE)HY.1943-7900.0001114).
- Kolker, A. S., Dausman, A.M., Allison, M.A., Brown, G.L., Chu, P.Y., de Mutsert, K., Fitzpatrick, C.E., Henkel, J.R., Justic, D., Kleiss, B.A., McCoy, E., Meselhe, E.A., and Richards, C.P. (2018), "Rethinking the River," *EOS*, 99, <https://doi.org/10.1029/2018EO101169>. Published on 19 June 2018.
- Sendrowski, A., Sadid, K., Meselhe, E.A., Wagner, W., Mohrig, D. and Passalacqua, P. (2018) "Transfer Entropy as a Tool for Hydrodynamic Model Validation," *Entropy*, vol. 20(1), 58, doi:10.3390/e20010058.
- Xing, F., Syvitski, J.P.M., Kettner, A.J., Meselhe, E.A., Atkinson, J.H. and Khadka, A. (2017) "Morphological responses of the Wax Lake Delta, Louisiana, to Hurricane Rita," *Elementa*, 5: 80, doi: <https://doi.org/10.1525/elementa.125>.
- Meselhe, E.A., Roelvink, D., Wackerman, C., Xing, F., Vo, Q.T. (2017) "Modeling the Process Response of Coastal and Deltaic Systems to Human and Global Changes," *Oceanography*, vol. 30(3), doi: 10.5670/oceanog.2017.317.
- Stephens, J., Ogston, A., Xing, F., Weathers, D., Meselhe, E.A., Allison, M.A., Di Leonardo, D. and McLachlan, R. (2017) "Sand Dynamics in the Mekong River Channel and Export to the Coastal Ocean," *Continental Shelf Research*, doi: 10.1016/j.csr.2017.08.004.
- Xing, F., Meselhe, E.A., Allison, M.A. and Weathers, D. (2017) "Analysis and Numerical Modeling of the Flow and Sand Dynamics in the Lower Song Hau Channel, Vietnam," *Continental Shelf Research*, 1 September, vol. 147, pages 62-77, <https://doi.org/10.1016/j.csr.2017.08.003>.
- Allison, M., Yuill, B.T., Meselhe, E.A., Marsh, J.K., Kolker, A.S. and Ameen, A.D. (2017) "Observational and Numerical Particle Tracking to Examine Sediment Dynamics in a Mississippi River Delta Diversion," *Estuarine, Coastal and Shelf Science*, doi: 10.1016/j.ecss.2017.06.004.
- Allison, M., Weathers, D. and Meselhe, E.A. (2017) "Bottom Morphology in the Song Hau Distributary Channel, Mekong River Delta, Vietnam," *Continental Shelf Research*, doi.org/10.1016/j.csr.2017.05.010.
- Meselhe, E.A., Sadid, K.M. and Allison, M.A. (2016) "Riverside morphological response to pulsed sediment diversion," *Geomorphology*, vol. 270, October, pages 184-202. doi: 10.1016/j.geomorph.2016.07.023.
- Yuill, B.T., Khadka, A.K., Pereira, J., Allison, M.A. and Meselhe, E.A. (2016) "Morphodynamics of the Erosional Phase of Crevasse-splay Evolution and Implications for River Sediment Diversion Function," *Geomorphology*, vol. 259, April, pages 12-29. doi: 10.1016/j.geomorph.2016.02.005.
- Gaweesh, A. and Meselhe, E.A. (2016) "Evaluation of Sediment Diversion Design Attributes and Their Impact on the Capture Efficiency," *Journal of Hydraulic Engineering*, ASCE, January, doi: 10.1061/(ASCE)HY.1943-7900.0001114.
- Yuill, B.T., Gaweesh, A., Allison, M.A. and Meselhe, E.A. (2015) "Morphodynamic Evolution of a Lower Mississippi River Channel Bar after Sand Mining," *Earth Surface Processes and Landforms*, August, doi: 10.1002/esp.3846.
- Michot, B., Meselhe, E., Krauss, K., Shrestha, S., From, A.S., and Patino, E. (2015) "Hydrologic Modeling in a Marsh–Mangrove Ecotone: Predicting Wetland Surface Water and Salinity

- Response to Restoration in the Ten Thousand Islands Region of Florida, USA," *Journal of Hydrologic Engineering*, [10.1061/\(ASCE\)HE.1943-5584.0001260](https://doi.org/10.1061/(ASCE)HE.1943-5584.0001260), D4015002.
- Allison, M.A., Ramirez, M.T. and Meselhe, E.A. (2014) "Diversion of Mississippi River Water Downstream of New Orleans, Louisiana, USA to Maximize Sediment Capture and Ameliorate Coastal Land Loss," *Water Resources Management*, vol. 28. ISSN 0920-4741, doi: 10.1007/s11269-014-0731-y.
- El Kheishy, K., McCorquodale, J., Georgiou, I. and Meselhe, E.A. (2014) "Bed Forms Resistance Dependency on Numerical Model Grid Size Spatial Resolution," *Journal of Spatial Science*, doi: 10.1080/14498596.2014.879746.
- Wang, H., Steyer, G.D., Couvillion, B.R., Rybczyk, J.M., Beck, H.J., Sleavin, W.J., Meselhe, E.A., Allison, M.A., Boustany, R.G., Fischenich, C.J. and Rivera-Monroy, V.H. (2014) "Forecasting Landscape Effects of Mississippi River Diversions on Elevation and Accretion in Louisiana Deltaic Wetlands under Future Environmental Uncertainty Scenarios," *Estuarine, Coastal and Shelf Science* 01/2014; doi:10.1016/j.ecss.2013.12.020
- Meselhe, E., McCorquodale, J.A., Shelden, J., Dortch, M., Brown, T. S., Elkan, P., Rodrigue, M. D., Schindler, J. K. and Wang, Z. (2013) "Eco-Hydrology Component of Louisiana's 2012 Coastal Master Plan: Mass-Balance Compartment Model," *Journal of Coastal Research*, vol. 67, pages 16-28.
- Rivera-Monroy, V.H., Branoff, B., Meselhe, E.A., McCorquodale, J.A., Dortch, M., Steyer, G.D., Visser, J., and Wang, H. (2013) "Landscape-Level Estimation of Nitrogen Removal in Coastal Wetlands: Potential Sinks under Different Restoration Scenarios," *Journal of Coastal Research*, vol. 67, pages 75-87.
- Allison, M.A., Vosburg, B.M., Ramirez, M.T., and Meselhe, E.A. (2012) "Mississippi River Channel Response to the Bonnet Carré Spillway Opening in the 2011 Flood and its Implications for the Design and Operation of River Diversions," *Journal of Hydrology*, <http://dx.doi.org/10.1016/j.jhydrol.2012.11.011>
- Meselhe, E.A., Georgiou, I., Allison, M.A., and McCorquodale, J.A. (2012) "Numerical Modeling of Hydrodynamics and Sediment Transport in Lower Mississippi at a Proposed Delta Building Diversion," *Journal of Hydrology*, vol. 472–473, November, pages 340-354.
- Wang, H., Meselhe, E.A., Waldon, M.G., Harwell, M.C. and Chen, C. (2012) "Compartment-based Hydrodynamic and Water Quality Modeling of a Northern Everglades Wetland, Florida, USA," *Ecological Modeling*, Elsevier, vol. 247, pages 273-285.
- Chen, C., Meselhe, E.A., and Waldon, M.G (2012) "Assessment of Mineral Concentration Impacts from Pumped Stormwater on an Everglades Wetland, Florida, USA – Using a Spatially-Explicit Model," *Journal of Hydrology*, Elsevier 452-453, pages 25-39.
- Allison, M.A., Demas, C.R., Ebersole, B.A., Kleis, B.A., Little, C.D., Meselhe, E.A., Powell, N.J., Pratt, T.C. and Vosburg, B.M. (2012) "A Water and Sediment Budget for the Lower Mississippi-Atchafalaya River in Flood Years 2008–2010: Implications for Sediment Discharge to the Oceans and Coastal Restoration in Louisiana," *Journal of Hydrology*, Elsevier 432-433, pages 84-97.
- Michot, B., Meselhe, E.A., Rivera-Monroy, V.H., Coronado-Molina, C. and Twilley, R.R. (2011) "A Tidal Creek Water Budget: Estimation of Groundwater Discharge and Overland Flow using Hydrologic Modeling in the Southern Everglades," *Estuarine, Coastal and Shelf Science*, 93(4), pages 438-448.
- Kheishy, K., McCorquodale, J, Georgiou, I, and Meselhe, E.A. (2010) "Three Dimensional Hydrodynamic Modeling Over Bed Forms in Open Channels," *International Journal of Sediment Research*, Science Direct, Elsevier, 25- 431-440.
- Rivera-Monroy, V.H., Twilley, R.R., Davis, S.E., III, Childers, D.L., Simard, M., Chambers, R., Jaffe, R., Boyer, J.N., Rudnick, D.T., Zhang, K., Castañeda-Moya, E., Ewe, S., Price, R.M., Coronado-Molina, C., Ross, M., Smith, T.J., III, Michot, B., Meselhe, E.A., Nuttle, W., Troxler, T. and Noe, G.B. (2010) "The Role of the Everglades Mangrove Ecotone Region (EMER) in Regulating

- Nutrient Cycling and Wetland Productivity in South Florida," *Critical Reviews in Environmental Science and Technology*, 41(S1), pages 1–37.
- Allison, M.A. and Meselhe, E.A. (2010) "The Use of Large Water and Sediment Diversions in the Lower Mississippi River (Louisiana) for Coastal Restoration," *Journal of Hydrology*, vol. 387, pages 346-360.
- Meselhe, E.A., Waldon, M.G., Arceneaux, J.C. (2010) "Water Budget Model for a Remnant Northern Everglades Wetland," *Journal of Hydraulic Research*, vol. 48(1), pages 100-105.
- Rego, J., Meselhe, E.A., Stronach, J., and Habib, E. (2010) "Numerical Modeling of the Mississippi-Atchafalaya Rivers' Sediment Transport and Fate: Considerations for Diversion Scenarios," *Journal of Coastal Research*, vol. 26(2), pages 212-229.
- Meselhe, E.A., Habib, E.H., Oche, O.C., and Gautam, S. (2009) "Sensitivity of Conceptual and Physically Based Hydrologic Models to Temporal and Spatial Rainfall Sampling," *Journal of Hydrologic Engineering*, ASCE, vol. 14(7), pages 655-771.
- Wang, H., Waldon, M.G., Meselhe, E.A., Arceneaux, J., Chen, C., and Harwell, M.C. (2009) "Surface Water Sulfate Dynamics in the Northern Florida Everglades, USA," *Journal of Environmental Quality*, vol. 38, pages 734-741.
- Pereira, J.F., McCorquodale, J.A., Meselhe, E.A., Georgiou, I.Y., and Allison, M.A., (2009) "Numerical Simulation of Bed Material Transport in the Lower Mississippi River," *Journal of Coastal Research*, Special Issue 56, pages 1449-1453, ISSN 0749-0258.
- Habib, E., Meselhe, E.A. and Aduvala, A. (2008) "Effect of Local Errors of Tipping-Bucket Rain Gauges on Rainfall-Runoff Simulations," *ASCE Journal of Hydrologic Engineering*, vol. 13(6), pages 411-528.
- Wang, H., Meselhe, E.A., Waldon, M.G., Surratt, D., Abdou, S., Chen, C. and Harwell, M. C. (2008) "Compartment Design for Wetland Water Quality Modeling in the Northern Florida Everglades, USA," *Journal of Environmental Hydrology*, vol. 16(1).
- Habib, E., Aduvala, A. and Meselhe, E. A. (2008) "Analysis of Radar-rainfall Error Characteristics and Implications for Streamflow Simulations Uncertainty," *Journal of Hydrologic Sciences*, vol. 53(3), 568.
- Habib, E., Larson, B., Nuttle, W.K., Nelson, B., Rivera-Monroy, V.H., Meselhe, E.A. and Twilley, R.R. (2008) "Effect of Rainfall Spatial Variability and Sampling on Salinity Prediction in an Estuarine System," *Journal of Hydrology*, vol. 350/1-2, 56-67, doi:10.1016/j.jhydrol.2007.11.034.
- Meselhe, E.A. and Hebert, K. (2007) "Laboratory Measurements of Flow through Culverts," *Journal of Hydraulic Engineering*, ASCE, vol. 133(8).
- Habib, E., Nuttle, W. K., Rivera-Monroy, V.H., Gautum, S., Meselhe, E.A., and Twilley, R.R. (2007) "Assessing Effects of Data Limitations on Salinity Forecasting in Barataria Basin, Louisiana, Using a Bayesian Analysis," *Journal of Coastal Research*, 23(3), pages 749-763.
- Habib, E.H. and Meselhe, E.A. (2006) "Stage-Discharge relations for Low-gradient Tidal Streams Using Data-Driven Models," *Journal of Hydraulic Engineering*, ASCE, vol. 132(5).
- Meselhe, E.A., Habib, E.H., Griborio, A.G., Chen, C., Gautam, S., McCorquodale, J.A., Georgiou, I.Y. and Stronach, J.A. (2005) "Multidimensional Modeling of the Lower Mississippi River," *Estuarine and Coastal Modeling*, pages 52-71.
- Meselhe, E.A., Ogden, F.L. and Forrest, Holly F.M. Jr. (2004) "Modeling of Supercritical Flow Conditions Revisited; New Scheme by Vedrana Kutija and Caspar J M. Hewett," *Discussion, Journal of Hydraulic Research*, IAHR, vol. 42(6).
- Meselhe, E.A., Peeva, T. and Muste, M.V.I. (2004) "Large Scale Particle Image Velocimetry for Low Velocity and Shallow Water Flows," *Journal of Hydraulic Engineering*, ASCE, vol. 130(9).
- Bradley A.A., Kruger, A., Meselhe, E.A. and Muste, M.V.I. (2002) "Low Flow Measurement in Streams Using Video Imagery," *Water Resources Research*, 38(12), 1315, doi: 10.1029/2002WR001317.
- Muste, M., Meselhe, E.A., Weber, L., and Bradley, A. A. (2001) "Coupled Physical-Numerical Analysis of Flows in Natural Waterways," *Journal of Hydraulic Research*, IAHR, vol. 39(1), pages 51-60.

- Meselhe, E.A. and Sotiropoulos, F. (2000) "Three Dimensional Numerical Model for Open Channels with Free Surface Variations," *Journal of Hydraulic Research*, IAHR, vol. 38(2), pages 115-121.
- Meselhe, E.A., Weber, L.A., Odgaard, A.J. and Johnson, T. (2000) "Numerical Modeling for Fish Diversion Studies," *Journal of Hydraulic Engineering*, ASCE, vol. 126(5), pages 365-374.
- Meselhe, E.A. (1999) "Computer Applications in Hydraulic Engineering," *Journal of Hydraulic Engineering*, ASCE, vol. 125(6).
- Atanov, G.A., Evaseeva, E.G., and Meselhe, E.A. (1999) "Estimation of the Roughness Profile in Trapezoidal Open Channels," *Journal of Hydraulic Engineering*, ASCE, vol. 125(3).
- Meselhe, E.A., and Odgaard, A.J. (1998) "Three-Dimensional Numerical Flow Model for Fish Diversion Studies at Wanapum Dam," *Journal of Hydraulic Engineering*, ASCE, vol. 124(12).
- Meselhe, E.A., Bradley, A., Kruger, A. and Muste, M. (1998) "PIV and Numerical Modeling for Flow Estimation and Analysis in Coastal Marshes" Recent Research in Coastal Louisiana: Natural System Function and Response to Human Influences, A symposium convened by the Louisiana Universities Marine Consortium 3-5 February 1998, Lafayette, Louisiana.
- Meselhe, E.A., Sotiropoulos, F., and Holly, F.M. Jr. (1997) "Numerical Simulation of Transcritical Flow in Open Channels," *Journal of Hydraulic Engineering*, ASCE, vol. 123(9).
- Meselhe, E.A. and Holly, F.M. Jr. (1997) "Invalidity of the Preissmann Scheme for Transcritical Flow," *Journal of Hydraulic Engineering*, ASCE, vol. 123(7).
- Meselhe, E.A. and Holly, F.M. Jr. (1993) "Simulation of Unsteady Flow in Irrigation Canals with Dry Bed," *Journal of Hydraulic Engineering*, ASCE, vol. 119 (9).

### **CLASSES TAUGHT**

- |           |   |
|-----------|---|
| RCSE 6800 | Introduction to River Science and Engineering (Co-Instructor) |
| RCSE 6820 | River-Coastal Hydrologic and Hydraulic Modeling               |
| RCSE 6900 | Independent Study   |

### **LAB GROUP**

- Kelin Hu (Research Assistant-Professor, RCSE)  
 Eric White (Ph.D., RCSE)  
 Ahmed Khalifa (Ph.D., RCSE starting Spring 2020)  
 Amr El Gamal (Ph.D., RCSE starting Spring 2020)

### **RESEARCH INTERESTS**

My research activities focus on development and application of numerical models to natural systems. I am particularly interested in integrating physical, ecological and social processes for inland watersheds riverine, deltaic and coastal systems.