## Hisham Eldardiry

Postdoctoral Research Associate
Department of Civil and Environmental Engineering, Cornell University, Ithaca, NY, USA
Lecturer, Department of Hydraulic Engineering, Alexandria University, Alexandria, Egypt

✉ hisham.eldardiry@cornell.edu | hisham.eldardiry@alexu.edu.eg
☎ [USA] (+1) 206-355-0953 | [Egypt] (+20) 101-825-5096
🌐 www.hishameldardiry.com

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### ACADEMIC ARENA

**Major:** Civil and Environmental Engineering
**Research Theme:** Water-Energy: Dynamics, Security and Sustainability
**Research Interests:** Extreme Events, Infrastructure Resilience, Integrated Modeling, Hydroinformatics, Remote Sensing
**Teaching Philosophy:** **S**upportive, **C**onciseness, **O**rganized, **P**racticability, and **E**ngaging [**SCOPE**]
**Teaching Expertise:** Hydraulics, Engineering Hydrology, Water Resources Management, Design of Hydraulic Structures, Statistical Hydrology, Remote Sensing and Geospatial Analysis
**Outreach Initiatives: Ni**le **B**asin **R**eservoir **A**dvisory **S**ystem [**NiBRAS**], **S**ensing **R**ivers [**SR**], HydroLingo, **G**lobal **E**quity in **S**cientific **R**esearch [**GESR**]

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## EDUCATION

**2017-2021**    **Ph.D., University of Washington, Seattle, WA, USA**
Department of Civil and Environmental Engineering

**2014-2016**    **Ph.D., University of Louisiana at Lafayette, LA, USA**
Systems Engineering Program [Civil Engineering Concentration]

**2013- 2014**    **M.Sc., University of Louisiana at Lafayette, LA, USA**
Department of Civil Engineering

**2005-2010**    **B.Sc., Alexandria University, Alexandria, Egypt**
Department of Civil Engineering

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## RESEARCH AND ACADEMIC APPOINTMENTS

**2024-Present**    **Postdoctoral Research Associate**
Critical Infrastructure Systems Laboratory,
Department of Civil and Environmental Engineering,
Cornell University, Ithaca, New York, USA
*Mentor: Dr. Stefano Galelli*

**2021-2024**    **Postdoctoral Research Associate**
Earth Systems Science Division,
Pacific Northwest National Laboratory (PNNL), Richland, Washington, USA
*Mentors: Dr. Nathalie Voisin and Dr. Ning Sun*

**2019- 2020**    **PhD Intern**
Atmospheric Sciences and Global Change Division,
Pacific Northwest National Laboratory (PNNL), Richland, Washington, USA
*Mentors: Dr. Maoyi Huang and Dr. Tian Zhou*

**2017-2021**    **Teaching and Research Assistant**
Department of Civil and Environmental Engineering,
University of Washington, Seattle, USA

*Advisor: Dr. Faisal Hossain*

**2013-2016**    **Teaching and Research Assistant**
Department of Civil Engineering,
University of Louisiana at Lafayette, USA
*Advisor: Dr. Emad Habib*

**2012-2013**    **Teaching and Research Assistant**
Department of Hydraulic Engineering,
Alexandria University, Egypt
*Mentor: Dr. Hossam Moghazy*

## RESEARCH EXPERIENCE

**[Research Metrics]**
Research Projects **[13]** || Peer-Reviewed Articles **[24]** || Citations **[362]** || h-index **[11]** || i10-index **[11]** ||
Conference Oral Presentations **[13]** || Conference Posters **[10]** || Invited Talks **[15]** || Media Coverage **[7]** ||
Peer Reviewer **[23]**

**[Research Projects]**

**Cornell University [CU]**

**2024-Present**    **Large-Scale Computing for Water-Energy Systems Using Model Couplers [CU-Funded]**
*Key Contributions:*
- Contributing to the development of *a model coupling toolkit* that allows to dynamically link a variety of existing water and power system models.

**Pacific Northwest National Laboratory [PNNL]**

**2022-2024**    **Integrated Coastal Modeling (ICoM) [DOE-Funded]**
*Key Contributions:*
- Contributed to the *process-based modeling of historical and future flood events* in the mid-Atlantic region, covering the Delaware and Susquehanna River basins.

**2019-2023**    **Integrated Multisector Multiscale Modeling (IM3) [DOE-Funded]**
*Key Contributions:*
- Developed a *modified version of the Variable Infiltration Capacity* (VIC) model that accounts for groundwater withdrawals, irrigation demands, and reservoir operation (VIC-GIRR).
- Led the *integrated modeling efforts to simulate the dynamics of coupled human-natural systems* over the contiguous US (CONUS), including: 1) Community Land Model (CLM) for simulating the hydrological cycle and land surface processes, and 2) MOSART-WM for routing streamflow in rivers, simulating dam operations, and allocating water to downstream users.
- Conducted in-depth analysis to distinguish between *forcing and parametric uncertainties in the CLM simulations* of key terrestrial water budget components.
- Evaluated the *impacts of drought events* on water scarcity, reservoir operations, and infrastructure resilience across the United States.

**University of Washington [UW]**

**2020-2021**    **Operational Services for Water, Disaster and Hydropower Applications [NASA-Funded]**

*Key Contributions:*
- Integrated expertise in modeling, remote sensing, web design and development (HTML/JavaScript), cloud computing (Google Earth Engine), geospatial analysis, and high-performance computing to *develop a web-based decision support system for near-real-time monitoring of dam operations* in the Nile River basin (Nile Basin Reservoir Advisory System-NiBRAS; hishameldardiry.com/nibras).

**2019-2021**  **Water-Energy Nexus in Transboundary River Basins [NASA- and NSF-Funded]**
*Key Contributions:*
- Assessed *adaptive solutions for effectively managing the operation of existing dams* while considering the impacts of planned upstream dams, with specific emphasis on the High Aswan Dam and Grand Ethiopian Renaissance Dam, as a typical paradigm of large hydropower dams in a transboundary basin.
- Implemented a *Forecast-Based Adaptive Reservoir Operation (FARO) framework* to evaluate the integration of long-term climate forecasts into real-time reservoir operations using monthly precipitation and temperature forecasts from a suite of eight North American Multi-Model Ensemble (NMME) models.

**2018-2020**  **Tracking Water Storage in Lakes using Satellite Remote Sensing [NASA-Funded]**
*Key Contributions:*
- Developed an *integrated modeling blueprint for the Nile River basin* to track current and future reservoir operations, incorporating satellite observations with hydrologic model (Variable Infiltration Capacity; VIC), evapotranspiration model (Surface Energy Balance Algorithm for Land; SEBAL), and reservoir water balance model.

**2017-2018**  **Effects of Global Change on Extreme Precipitation and Flooding [DoD-Funded]**
*Key Contributions:*
- Analyzed *Atmospheric Rivers (AR)* in the Western US and assessed their influence on rainfall and snowpack patterns.

## University of Louisiana at Lafayette [UL]

**2015-2016**  **Water Sustainability and Climate [NSF-Funded]**
*Key Contributions:*
- Assessed *water scarcity patterns across the CONUS* by accounting for both inter- and intra-annual variability at a small watershed scale (HUC12).
- Evaluated the potential opportunities and challenges of implementing *carbon capture and sequestration (CCS)* and its implications for freshwater resource sustainability.

**2015-2016**  **Improving Student Learning in Hydrology and Water Resources Engineering [NSF-Funded]**
*Key Contributions:*
- Contributed to the *development of web-based modules for enhancing active student learning* in hydrology and water resources engineering (HydroViz; https://hydroviz.org and HydroLearn; https://www.hydrolearn.org).

**2013-2016**  **Extreme Precipitation and Coastal Hazards in the Northern Gulf Coast [NSF-Funded]**
*Key Contributions:*
- Evaluated *radar-based quantitative precipitation products* and their use in deriving heavy rainfall statistics and frequency analysis.

## Alexandria University [AU]

**2022-2023** **NASA/SWOT Mission Early Adopter Applications [Unfunded Research Collaborations]**
*Key Contributions:*
- Led a *NASA/SWOT Early Adopter (EA) team* to test SWOT synthetic data for reservoir water balance modeling and understand its capabilities for monitoring dam operations in the Nile River Basin.

**2020-2022** **Integrated Modeling of Transboundary Water Resources [Unfunded Research Collaborations]**
*Key Contributions:*
- Applied a *multi-sensor satellite approach integrated with hydrological modeling* to infer dam operations and predict flood inundation extents over the Nile River Basin.

**2011-2013** **Local Scour and Sediment Dynamics around Hydraulic Structures [Unfunded Research Collaborations]**
*Key Contributions:*
- Analyzed *local scouring and sediment dynamics* at bridge piers using both experimental and numerical simulations.

## PUBLICATIONS

**[In Review/In Preparation]**

30. **Eldardiry, H.**, Sun, N., and Voisin, N. *(in preparation)*. Historical and future reservoir droughts over the conterminous United States *(Target Journal: Water Resources Research)*.

29. Thompson, I., **Eldardiry, H.**, Voisin, N., Sun, N., Thurber, T., and Rice, J. *(in preparation)*. High Resolution Monthly Water demand Scenarios for the Continental US *(Target Journal: Nature-Scientific Data)*.

28. **Eldardiry, H.**, Yan, H., Sun, N., Reed, P., and Rice, J. *(in review)*. Characterizing How Meteorological Forcing Selection and Parameter Uncertainty Influence Community Land Model Version 5 Hydrological Applications in the United States *(Journal of Advances in Modeling Earth Systems)*.

27. Yan, H., Sun, N., **Eldardiry, H.**, Thurber, T. B., Reed, P. M., et al. *(in review)*. Ensemble-based Spatially Distributed CLM5 Hydrological Parameter Estimation for the Continental United States *(Journal of Advances in Modeling Earth Systems)*.

26. Cooper, M., Sun, N., Wigmosta, M., **Eldardiry, H.**, Deb, M., Yang, Z., and Judi, D. *(in review)*. Synchronized River Flooding Upstream of a Major Coastal Estuary Enhanced under Climate Warming *(Nature-Water)*.

25. Simeone, C., Hammond, J., Archfield, S., Droman, D., Condon, L., **Eldardiry, H.**, Olson, C., and Steyaert, J. *(in review)*. Declining Reservoir Reliability and Increasing Reservoir Vulnerability: Long-Term Observations Reveal Longer and More Severe Periods of Low Reservoir Storage for Major United States Reservoirs *(Geophysical Research Letters)*.

**[2024]**

24. Sun, N., Wigmosta, M., Yan, H., **Eldardiry, H.**, Yang, Z., et al. (2024). Amplified Extreme Floods and Shifting Flood Mechanisms in the Delaware River Basin in Future Climates. *Earth's Future,* 12(3), e2023EF003868. https://doi.org/10.1029/2023EF003868

**[2023]**

23. Hossain, F., Alwash, A., Minocha, S., and **Eldardiry, H.** (2023). Restoring the Mesopotamian Rivers for Future Generations: A Practical Approach. *Water Resources Research*, e2023WR034514. https://doi.org/10.1029/2023WR034514

22. Yan, H., Sun, N., **Eldardiry, H.**, Thurber, T. B., Reed, P. M., Malek, K., et al. (2023). Large ensemble diagnostic evaluation of hydrologic parameter uncertainty in the Community Land Model Version 5 (CLM5). *Journal of Advances in Modeling Earth Systems*, 15(5), e2022MS003312. https://doi.org/10.1029/2022MS003312

21. Yan, H., Sun, N., **Eldardiry, H.**, Thurber, T. B., Reed, P. M., Malek, et al. (2023). Characterizing uncertainty in Community Land Model version 5 hydrological applications in the United States. *Scientific Data*, 10(1), 187. https://doi.org/10.1038/s41597-023-02049-7

20. Abdelmoneim, H., **Eldardiry, H.**, Saber, M., Kantoush, S. A., Moghazy, H. M., and Sumi, T. (2023). Integrating multi-sensor observations and rainfall-runoff inundation modeling for mapping flood extents over the Nile River basin: example from the 2020 flooding in Sudan. *Geocarto International*, 38(1), 2197504. https://doi.org/10.1080/10106049.2023.2197504

**[2022]**

19. Hossain, F., et al. (2022). Building User-Readiness for Satellite Earth Observing Missions: The Case of the Surface Water and Ocean Topography (SWOT) Mission. *AGU Advances*, 3, e2022AV000680. https://doi.org/10.1029/2022AV000680

18. **Eldardiry, H.**, Hossain, F., Srinivasan, M. and Tsontos, V. (2022). Success Stories of Satellite Radar Altimeter Applications. *Bulletin of American Meteorological Society*, 103(1), E33-E53. https://doi.org/10.1175/BAMS-D-21-0065.1

17. **Eldardiry, H.**, Zhou, T., Huang, M., and Chegwidden, O. (2022). The Role of Groundwater Withdrawals on River Regulation: Example from the Columbia River Basin. *Water Resources Research, 58(6)*. https://doi.org/10.1029/2020WR028955

16. Abdelmoneim, H., **Eldardiry, H.**, Moghazy, H., Eladawy, A. (2022). Inferring the Joint Operation of High Aswan Dam and Toshka Lakes using Multi-Sensor Satellite Approach. *Geocarto International, 1-13. https://doi.org/10.1080/10106049.2022.2086632*

**[2021]**

15. **Eldardiry, H.**, and Hossain, F. (2021). The Value of Long-term Streamflow Forecasts in Adaptive Reservoir Operation: The Case of High Aswan Dam in the Transboundary Nile River Basin. *Journal of Hydrometeorology*, 22(5), 1099-1115. https://doi.org/10.1175/JHM-D-20-0241.1

14. **Eldardiry, H.**, and Hossain, F. (2021). Evaluating the hydropower potential of the Grand Ethiopian Renaissance Dam. *Journal of Renewable and Sustainable Energy*, 13(2). https://doi.org/10.1063/5.0028037

13. Bose, I., Hossain, F., **Eldardiry, H.**, Ahmad, S., Biswas, N., Bhatti, A., Lee, H., Aziz, M., and Khan (2021). Integrating Gravimetry Data with Thermal Infra-red Data from Satellites to Improve Efficiency of Operational Irrigation Advisory in South Asia. *Water Resources Research,* 57(4), e2020WR028654. https://doi.org/10.1029/2020WR028654

**[2020]**

12. **Eldardiry, H.**, and Hossain, F. (2020). A Blueprint for Adapting High Aswan Dam Operation in Egypt to Challenges of Filling and Operation of the Grand Ethiopian Renaissance Dam. *Journal of Hydrology*. https://doi.org/10.1016/j.jhydrol.2020.125708

11. **Eldardiry, H.**, and Habib, E. (2020). Examining the Robustness of a Spatial Bootstrap Regional Approach for Radar-based Hourly Precipitation Frequency Analysis. *Remote Sensing*. 12(22), 3767. https://doi.org/10.3390/rs12223767

10. **Eldardiry, H.**, Habib, E., and Borrok, D. M. (2020). Accounting for Inter-Annual and Seasonal Variability in Assessment of Water Supply Stress: Perspectives from a humid region in the USA. *Water Resources Management*, 34, 2517–2534. https://doi.org/10.1007/s11269-020-02569-6

**[2019]**
9. **Eldardiry, H.**, and Hossain, F. (2019). Understanding Reservoir Operating Rules in the Transboundary Nile River Basin Using Macroscale Hydrologic Modeling with Satellite Measurements. Journal of Hydrometeorology, 20(11), 2253-2269. https://doi.org/10.1175/JHM-D-19-0058.1

8. Ahmad, S. K., Hossain, F., **Eldardiry, H.**, and Pavelsky, T. M. (2019). A Fusion Approach for Water Area Classification Using Visible, Near Infrared and Synthetic Aperture Radar for South Asian Conditions. *IEEE Transactions on Geoscience and Remote Sensing*. https://doi.org/10.1109/TGRS.2019.2950705

7. **Eldardiry, H.**, Mahmood, A., Chen, X., Hossain, F., Nijssen, B., and Lettenmaier, D. P. (2019). Atmospheric River–Induced Precipitation and Snowpack during the Western United States Cold Season. *Journal of Hydrometeorology*, 20(4), 613-630. https://doi.org/10.1175/JHM-D-18-0228.1

**[2018]**
6. **Eldardiry, H.**, and Habib, E. (2018). Carbon capture and sequestration in power generation: review of impacts and opportunities for water sustainability. *Energy, Sustainability and Society*, 8(1), 6. https://doi.org/10.1186/s13705-018-0146-3

5. Borrok, D. M., Chen, J., **Eldardiry, H.**, and Habib, E. (2018). A Framework for Incorporating the Impact of Water Quality on Water Supply Stress: An Example from Louisiana, USA. *JAWRA Journal of the American Water Resources Association*. https://doi.org/10.1111/1752-1688.12597

**[2017]**
4. Habib, E., **Eldardiry, H.**, and Tidwell, V. (2017), New online tool teaches students about the energy-water nexus, *Eos*, 98. https://doi.org/10.1029/2017EO084487

**[2016]**
3. **Eldardiry, H.**, Habib, E., and Borrok, D. M. (2016). Small-scale catchment analysis of water stress in wet regions of the US: an example from Louisiana. *Environmental Research Letters*, 11(12), 124031. https://doi.org/10.1088/1748-9326/aa51dc

**[2015]**
2. **Eldardiry, H.**, Habib, E., Zhang, Y., and Graschel, J. (2015). Artifacts in Stage IV NWS Real-Time Multisensor Precipitation Estimates and Impacts on Identification of Maximum Series. *Journal of Hydrologic Engineering*, 22(5), E4015003. https://doi.org/10.1061/(ASCE)HE.1943-5584.0001291

1. **Eldardiry, H.**, Habib, E., and Zhang, Y. (2015). On the use of radar-based quantitative precipitation estimates for precipitation frequency analysis. *Journal of Hydrology*, 531, 441-453. https://doi.org/10.1016/j.jhydrol.2015.05.016

## CONFERENCE PRESENTATIONS

**[Oral Presentations]**
13. **Eldardiry, H.**, et al. (2023). Forcing-dependent parametric uncertainty in community land model simulations: evaluation of hydrologic signatures over the conterminous United States. The *28th Annual Community Earth System Model (CESM) Workshop, June 12th - 15th, 2023, Boulder, CO, USA.*

12. **Eldardiry, H.**, Sun, N., Voisin, N., Turner, S., and Broman, D. (2022). Historical and future reservoir droughts over the conterminous United States. *The American Geophysical Union (AGU) Fall Meeting (H22C-05), December 12th - 16th, 2022, Chicago, IL, USA.*

11. **Eldardiry, H.**, et al. (2022). Dominant source of uncertainty in CLM simulations of hydrological signatures: a CONUS-scale comparison between forcing and parametric uncertainty. *The American Geophysical Union (AGU) Fall Meeting (H22C-05), December 12th - 16th, 2022, Chicago, IL, USA.*

10. **Eldardiry, H.**, et al. (2022). Propagation of Meteorological Forcing Uncertainty into Community Land Model Simulations: Evaluation of Hydrologic Signatures over the Conterminous United States. *The 102nd American Meteorological Society Annual Meeting (AMS), January 23rd - 27th, 2022, Houston, TX, USA.*

9. **Eldardiry, H.**, Sun, N., and Yan, H. (2021). Groundwater Storage during Snow Drought Events: Responses to Changing Climate over Western United States. *The American Geophysical Union (AGU) Fall Meeting (H22C-05), December 13th - 17th, 2021, New Orleans, LA, USA.*

8. **Eldardiry, H.**, and Hossain, F. (2020). The Value of Long-term Streamflow Forecasts in Adaptive Reservoir Operation: The case of High Aswan Dam in the Transboundary Nile River Basin. *The American Geophysical Union (AGU) Fall Meeting (H161-07), December 1st - 17th, 2020.*

7. **Eldardiry, H.**, and Hossain, F. (2020). A Blueprint for Adapting High Aswan Dam Operation to Challenges of Filling and Operation of the Grand Ethiopian Renaissance Dam. *Cairo Water Week, October 18th – 22nd, 2020, Cairo, Egypt.*

6. **Eldardiry, H.**, and Hossain, F. (2020). Adaptive Reservoir Operation under the Challenges of Transboundary Dams: Example from the Nile River Basin Using Satellite Remote Sensing. *International Conference on the Nile and Grand Ethiopian Renaissance Dam, August 20th – 21st, 2020, Florida International University, Miami, FL, USA.*

5. **Eldardiry, H.**, Zhou, T., and Huang, M. (2020). The Role of Groundwater Withdrawals on River Regulation. *PNNL Research Symposium, August 20th, 2020, Richland, WA, USA.*

4. **Eldardiry, H.**, and Habib, E., (2016). The Use of Remote-Sensing Based Multi-Sensor Quantitative Precipitation Estimates in Deriving Extreme Precipitation Frequencies: Implications for Flash Flood Monitoring. *The Second International Symposium on Flash Floods in Wadi Systems, October 26th – 27th, 2016, Technische Universität Berlin, Campus El Gouna, El Gouna, Egypt.*

3. **Eldardiry, H.**, Habib, E., and Borrok, D., (2016). Assessment of Water Supply Stresses in Southwest Louisiana under Effects of Climate Variability. *State of the Coast, June 1st – 3rd, 2016, New Orleans, Louisiana, USA.*

2. **Eldardiry, H.**, Habib, and E., Borrok, D., (2016). Assessment of Water Availability and Stress in Louisiana Using Multi-Scale Datasets and Model Outputs. *Data Flow Conference, May 9th - 10th, 2016, Louisiana State University, Baton Rouge, LA, USA.*

1. **Eldardiry, H.**, Habib, E., and Borrok, D., Broussard, W., (2016). Assessment of Water Supply Stresses in Louisiana under Effects of Climate Variability. *The 10th Annual Louisiana Groundwater, Surface Water, and Water Resources Symposium, March 24th - 25th, 2016, Louisiana State University, Baton Rouge, LA, USA.*

**[Poster Presentations]**

10. **Eldardiry, H.**, Yan, H., Sun, N., Reed, P., and Rice, J. (2023). Understanding How Forcing Selection and Parameter Uncertainty Influence Community Land Model Hydrological Applications in the United States. *The American Geophysical Union (AGU) Fall Meeting (GC21M-1098), December 11th - 15th, 2023, San Francisco, CA, USA.*

9. **Eldardiry, H.** (2021). Adaptive Reservoir Operation in the Transboundary Nile River Basin: Towards Win-Win Solutions. *The 2021 Arab-American Frontiers of Science, Engineering, and Medicine Symposium, November 1st -3rd, 2021, Doha, Qatar.*

8. **Eldardiry, H.**, Zhou, T., and Huang, M. (2020). The Role of Groundwater Withdrawals on River Regulation: Example from the Columbia River Basin. *The 100th American Meteorological Society Annual Meeting (AMS), January 12th - 16th, 2017, Boston, MA, USA.*

7. **Eldardiry, H.**, and Hossain, F., (2019). Re-Evaluating the Operating Rule of High Aswan Dam under the Combined Impacts of Transboundary dams and Cropping Patterns: A Satellite-based Approach. *The American Geophysical Union (AGU) Fall Meeting (H31N-1937), December 9th - 13th, 2019, San Francisco, CA, USA.*

6. **Eldardiry, H.**, and Hossain, F., (2018). Understanding the Reservoir Operating Rules in the Nile River Basin using Macroscale Hydrologic Modeling with Satellite Observations. *The American Geophysical Union (AGU) Fall Meeting (H43G-2505), December 10th - 14th, 2018, Washington D.C., USA.*

5. **Eldardiry, H.**, and Hossain, F., (2017). Composite Analysis of Cold Season Atmospheric River Events: Extreme Precipitation and Flooding over the Western United States. *The American Geophysical Union (AGU) Fall Meeting (H23F-1747), December 11th - 15th, 2017, New Orleans, LA, USA.*

4. **Eldardiry, H.**, Habib, E. H., Unruh, H. G., and Tidwell, V. C., (2016). Development of a Pilot Learning Module on Water Energy Nexus Using a Data-Analytic and Hypothesis-Driven Approach. *The American Geophysical Union (AGU) Fall Meeting (ED43E-0891), December 12th - 16th, 2016, San Francisco, CA, USA.*

3. **Eldardiry, H.**, Habib, E., and Borrok, D., (2016). Assessment of Water Supply Stresses in Louisiana under Effects of Climate Variability. *National Science Foundation (NSF), Water Sustainability and Climate (WSC) Principal Investigators Meeting, March 9th – 11th, Washington, D.C., USA.*

2. **Eldardiry, H.**, and Habib, E. (2014). The Use of Multi-Sensor Quantitative Precipitation Estimates for Deriving Extreme Precipitation Frequencies with Application in Louisiana. *The American Geophysical Union (AGU) Fall Meeting, December 15th - 19th, 2014, San Francisco, CA, USA.*

1. **Eldardiry, H.**, and Habib, E. (2014). Artifacts in Stage IV NWS Real-time Multisensor Precipitation Estimates and Impacts on Identification of Maximum Series. *International Weather Radar and Hydrology Symposium (WRaH 2014), April 7th -10th, 2014, Washington, D.C., USA.*

## AWARDS AND HONORS

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| **2021** | Member of the AGU *Voices for Science* 4th cohort (Communication/Media Track). |
| **2020** | University of Washington, recipient of the *Ronald and Mary Nece Endowed Fellowship,* awarded annually to the top Ph.D. students in the hydrology and hydrodynamics program, based on Ph.D. dissertation, scholarship and academic performance. |
| **2020** | American Water Resources Association (AWRA), recipient of the *AWRA Graduate Fellowship* for Washington State Section. |
| **2016** | *Louisiana Engineering Society (LES) award* for graduate poster contest of the Engineering and Technology week. |
| **2015** | University of Louisiana at Lafayette, University Honors Program, recognized in "*Academic Honors Day*" for outstanding academic achievement. |
| **2014** | Member of the *Honor Society of Phi Kappa Phi*, University of Louisiana at Lafayette. |

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| **2008-2009** | Recipient of *Dr. Monir Kansoh Award* for excellence achievements in Engineering Hydraulics. |
| **2007-2010** | Recognized in "*Academic Honors Day*" for distinction grade in the Civil Engineering Classes, Alexandria University, Egypt. |
| **2005** | Recognized by the *Ministry of Education, Egypt*, for completing the high school with an honorable grade and ranking among the top ten students nationwide. |

## FELLOWSHIPS AND GRANTS

**[Fellowships and Assistantships]**

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| **2020** | University of Washington, recipient of the Ronald and Mary Nece Endowed Fellowship. |
| **2020** | American Water Resources Association (AWRA), recipient of the AWRA Graduate Fellowship for Washington State Section. |
| **2017-2021** | Graduate Assistantship, Department of Civil and Environmental Engineering, University of Washington, Seattle, USA. |
| **2013-2016** | Graduate Assistantship, Department of Civil Engineering, University of Louisiana at Lafayette, USA. |
| **2005-2010** | Recipient of Mohamed Farid Khamis (MFK) Foundation Scholarship (awarded to top ranked high school students to support university studies). |

**[Travel Grants]**

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| **2019** | CUASHI travel support to attend a short course on Food, Energy and Water Systems in a Global Economy. |
| **2016** | UNESCO Cairo Office (Regional Bureau for Sciences in the Arab States) travel support to participate in the Second International Symposium on Flash Floods in Wadi Systems. |
| **2016** | The Camille Jordan Institute funding to support the participation in the Summer School: Extreme Value Modeling and Water Resources. |
| **2016** | CUASHI travel support to participate in the NSF Water Sustainability and Climate (WSC) Principal Investigators Meeting. |
| **2014** | Divisions of Atmospheric and Geo-space Sciences and Hydrological Sciences of National Science Foundation (NSF) funding to support the participation in Weather Radar and Hydrology Symposium (WRaH 2014). |
| **2014** | Student Government Association (SGA), University of Louisiana at Lafayette, travel funding to support the participation in the Fall Meeting of American Geophysical Union (AGU 2014). |
| **2014** | Graduate Student Organization (GSO), University of Louisiana at Lafayette, travel funding to support the participation in Weather Radar and Hydrology Symposium (WRaH 2014). |

## SCIENCE OUTREACH ACTIVITIES

**[Invited Talks]**

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| **2024** | **How Forcing Selection and Parameter Uncertainty Influence Community Land Model Hydrological Applications in the United States** <br> Invited by: |

- Energy and Water Resources Systems Seminar organized by the Department of Civil and Environmental Engineering at Cornell University (May 2024).

**2023**   **Shedding Light from Space on Dam Operations: Towards Adaptive Reservoir Operation in the Transboundary River Basins**
Invited by:
- U.S.-Iraqi Research-Focused Dialogues on Mesopotamian River Revival, organized by the U.S. National Academies of Sciences, Engineering, and Medicine (January 2023).

**2022**   **Adaptive Reservoir Operation in the Transboundary Nile River Basin: Towards Win-Win Solutions**
Invited by:
- WeAspire Town Hall: The GERD and Beyond (April 2022).

**Shedding Light from Space on Dam Operations: Towards Adaptive Reservoir Operation in the Transboundary Nile River Basin**
Invited by:
- University of California, Los Angeles (UCLA) Nile River Basin Webinar Series (February 2022).

**2021**   **Shedding Light from Space on Dam Operations: Introducing Nile Basin Reservoir Advisory System (NiBRAS)**
Invited by:
- Center for Climate Sciences (CSS) at Jet Propulsion Laboratory (JPL), NASA (September 2021).
- Nile Talk Forum organized by the Institute of Environment at the Florida International University (July 2021).
- Ministry of Water Resources and Irrigation, Egypt (May 2021).

**The Value of Long-term Streamflow Forecasts in Adaptive Reservoir Operation: The case of High Aswan Dam in the Transboundary Nile River Basin**
Invited by:
- AWRA and AIH Webinar Series: Forecast-Informed Reservoir Operations (FIRO) (May 2021).
- Forum for Research Initiatives, Exchange of Knowledge, and Development Support (FRIENDS) (October 2021).

**Future Operation of High Aswan Dam: Challenges and Opportunities**
Invited by:
- The 6th Nile Basin Development Forum organized by the Nile Basin Initiative (March 2021).
- Nile Talk Forum organized by the Institute of Environment at the Florida International University (March 2021).

**2020**   **Adaptive Reservoir Operation in the Transboundary Nile River Basin: Towards Win-Win Solutions**
Invited by:
- Environment and Water Program Seminar Series organized by the Department of Civil and Environmental Engineering at the University of Washington, Seattle (October 2020).
- Quantitative Seminar Series organized by the School of Aquatic and Fishery Sciences at the University of Washington (February 2020).

**Water Management Challenges in the Transboundary Nile River Basin**

Invited by:
- Data, Science, and Diplomacy Class in the Henry M. Jackson School of International Studies, University of Washington, Seattle (October 2020).
- Quantitative Water Resources Management Class in the Department of Civil and Environmental Engineering, University of Washington, Seattle (February 2020).

## [Media Coverage]

**2022**    **NASA Earth Observatory**
Interviewed by Adam Voiland to share my experience on how to use satellite remote sensing to monitor the operations of dams and provide some lessons learned from the case of High Aswan Dam and Grand Ethiopian Renaissance Dam. The article is available at NASA Earth Observatory

**IEEE Spectrum**
Interviewed by Rahul Rao to share insights on the water and energy security in the Nile river basin following the construction of the Grand Ethiopian Renaissance Dam. The article is available at IEEE Spectrum

**2021**    *The Conversation*
Contributed to The Conversation Africa edition with a piece of article on how to turn confrontation about Africa's biggest hydropower dam to cooperation. The article is available at The Conversation

*QPosts Interview*
Interviewed by the Egyptian journalist Ahmed Adly to share my perspectives on the importance of data sharing to resolve the Nile conflict. The article is published in Arabic at Qposts

*ArabNews Scrollytelling Article*
Interviewed by Jonathan Gornall to participate in an Arab News scrollytelling article "Battle for the Nile" to provide an in-depth examination of the potential impacts on downstream Nile states during the filling and operation of the Grand Ethiopian Renaissance Dam. The article is published at ArabNews

*SciDevNet Interview*
Interviewed by the Egyptian journalist Rehab Abdelmohsen to provide insights from integrating remote sensing observations into Nile River Basin Reservoir Advisory System (NiBRAS). The article is published in Arabic at SciDevNet

**2020**    *BBC Science in Action Radio Programme*
Invited for an interview in "Science in Action" weekly radio programme to talk about the future of the Nile under the challenges of Grand Ethiopian Renaissance Dam. The "Science in Action" episodes are produced by the BBC world service and hosted by the British journalist Roland Pease. The Episode is available on BBC Sounds

## [Stakeholder Engagement]

**2023**    *Global Equity in Scientific Research (GESR) Vision*
GSER vision, drawing its essence from the Arabic word for *"bridge"* is grounded in the firm belief that every individual, regardless of background, should have equal access and meaningful participation in the global scientific research. The GESR vision focuses on research inequalities challenges that can manifest in various forms of the research process

including: access to resources, publication and visibility, representation and diversity, and global knowledge distribution.

**2022**     ***U.S.-Iraqi Research-Focused Dialogues on Mesopotamian River Revival***
Invited to participate in the U.S.-Iraqi Research-Focused Dialogues on Mesopotamian River Revival organized by the U.S. National Academies of Sciences, Engineering, and Medicine.

**2021**     ***SWOT Early Adopter Program***
Leading the Early Adopter (EA) team of Alexandria University (Egypt) to integrate Surface Water and Ocean Topography (SWOT) Mission into the operational Nile Basin Reservoir Advisory System (NiBRAS).

**2020-2021**     ***NASA/CNES SWOT Virtual Hackathon***
Supporting SWOT Early Adopter (EA) teams from Indian Institute of Technology Delhi (IITD) (June 2020) and Texas Water Development Board (TWDB) (March 2021).

**2020**     ***Sensing Rivers Workshop (SR 2020)***
More than 20 attendees from the Nile River countries participated in a 3-day virtual workshop to learn about satellite remote sensing applications in water resources management (September 21-23, 2020). Recordings are available on YouTube.

**2020**     ***Nile Basin Reservoir Advisory System (NiBRAS)***
A satellite-based decision support system that aim to facilitate the understanding of water-energy dynamics in transboundary basins and provide a basis for evaluating potential solutions. A beta version of the NiBRAS system is readily accessible via the following link: NiBRAS.

**2020**     ***HydroLingo Initiative***
An initiative to make water-related research available in different languages.

## [K-12 Education]

**2017-2018**     Engineering Discovery Days, University of Washington, Seattle.

**2013**     Coastal Science Series, S. J. Montgomery Elementary School, Lafayette, Louisiana.

## [Scientific Storytelling]

**2020**     SASWE Promo Film: Part of a production team at the University of Washington to produce the promo film for SASWE (SAtellites, Sustainability, Water, and Environment) research group. The film won the Public Messaging and Engagement Award for the 2nd University of Washington Student Film Contest.

## TOOLS DEVELOPMENT

### [Decision Support Systems]

Building web-based operational systems that aim to facilitate the understanding of water-energy dynamics in transboundary basins and provide a basis for evaluating potential solutions.

- **Nile Basin Reservoir Advisory System (NiBRAS)**
  A satellite-based decision support system for advising reservoir operation in the Nile river basin (hishameldardiry.com/nibras). NiBRAS comprises six tools:
  [1] Monitoring Reservoir Operation (MRO) *[Status: Operational]*
  [2] Monitoring Reservoir Initial Impoundment (MRI$_2$) *[Status: Operational]*
  [3] Forecast-based Adaptive Reservoir Operation (FARO) *[Status: In Progress]*
  [4] Scenario-based Assessments of Reservoir Operation (SARO) *[Status: In Progress]*
  [5] Monitoring of Reservoir Temperature (MRT) *[Status: In Progress]*

[6] Monitoring of Reservoir Sedimentation (MRS) *[Status: In Progress]*
- **Reservoir Assessment Tool for Water Quality and Quantity Monitor (RAT-WQ$^2$)**
  Building web-based operational systems that aim to monitor stream temperature changes due to dam operations. RAT-WQ$^2$ is currently operational over three different regions: Texas state (US), Indus River Basin, and Kerala state (India)
  - ✓ Texas RAT-WQ$^2$ (http://depts.washington.edu/saswe/texas/)
  - ✓ Indus RAT-WQ$^2$ (http://depts.washington.edu/saswe/indus/)
  - ✓ Kerala RAT-WQ$^2$ (http://depts.washington.edu/saswe/kerala/)

**[Educational Platforms]**
Contributing to the development of web-based tools for enhancing student learning in engineering hydrology:
- **HydroViz** (https://hydroviz.org)
- **HydroLearn** (https://www.hydrolearn.org)

## TECHNICAL TRAININGS AND WORKSHOPS

| | |
|---|---|
| **2020** | NASA Summer School on Satellite Observations and Climate Models, organized by the JPL Center for Climate Sciences and the Keck Institute for Space Studies (August 17-28, 2020). |
| **2019** | CUASHI Master Class: Food, Energy, Water Systems in a Global Economy, Northern Arizona University in Flagstaff, AZ, USA (May 13-16, 2019). |
| **2018** | Two days of Google Earth Engine Workshop for beginner and advanced users, Google Office, Washington D.C., USA (December 12-13, 2018). |
| **2016** | Summer School: Extreme Value Modeling and Water Resources, the Camille Jordan Institute, Université Claude Bernard Lyon 1, France (June 13-24, 2016). |
| **2015** | Preparing More Competitive NSF Grant Proposals workshop organized by University of Louisiana at Lafayette, Institute for Materials Research and Innovation (IMRI), the Office of the Vice President for Research and the College of Engineering, USA (November 20, 2015). |
| **2013** | RiverWare Training Course for the development of a RiverWare model for the Eastern Nile Basin (Eastern Nile Numerical Modeling Laboratory, Cairo University, Egypt (June 30- July 4, 2013). |
| **2012** | Training Course on Using Hydro-BEAM (Hydrological River Basin Environmental Assessment) for Modeling the Nile River Basin, National Water Research Center (NWRC), Egypt (October 8-11, 2012). |

## TEACHING TRAINING

| | |
|---|---|
| **2023** | **Faculty and Leadership Development Center (FLDC)** <br> **Alexandria University, Egypt** <br> **Topics:** Research Ethics and Plagiarism, Exams and Students Evaluation Systems, Quality Standards in Education, Competitive Research Projects Proposals, Statistical Design and Analysis System, and Quality Standards in Teaching. |
| **2016** | **Office of the First-Year Experience** <br> **University of Louisiana at Lafayette, USA** |

**Topics:** Developing an Effective Syllabus, Designing Assignments for First-Year Students, Grading, Classroom Management, and Active Learning Strategies.

**2013**   **Faculty and Leadership Development Center (FLDC)**
**Alexandria University, Egypt**
**Topics:** Strategic Planning, University Legal and Financial Aspects, Ethical Conduct and Code of Ethics, Student Evaluation and Examination Techniques, Research Ethics, and Credit Hour System.

## TEACHING EXPERIENCE

**Department of Civil and Environmental Engineering**
**University of Washington, Seattle, USA**
**2020-2021**   NASA/CNES SWOT Virtual Hackathon *(Support Team)*
**2017-2020**   Water Resources and Hydraulic Engineering Capstone Design *(Teaching Assistant)*
**2019**   Google Earth Engine Sessions, WaterHackWeek *(Assistant Instructor)*
**2019**   Quantitative Water Resources Management *(Teaching Assistant)*

**Department of Civil Engineering**
**University of Louisiana at Lafayette, USA**
**2015**   Engineering Hydrology *(Teaching Assistant)*
**2015**   Water Resources Capstone Design *(Teaching Assistant)*
**2013**   Engineering Hydraulics *(Teaching Assistant)*

**Department of Hydraulic Engineering**
**Alexandria University, Egypt**
**2012-2016**   Design of Hydraulic Structures *(Assistant Lecturer)*
**2016**   Advanced Hydrology *(Assistant Lecturer)*
**2013**   Computer Applications in Hydraulics *(Teaching Assistant)*
**2012**   Fluid Mechanics *(Teaching Assistant)*

## SCIENCE COMMUNICATION TRAINING

**2021**   **ComSciCon Flagship Workshop**
Selected to attend the 9th Annual ComSciCon Flagship Workshop (August 4-7, 2021) (comscicon.com/people/hisham-eldardiry).

**2021**   **AGU Voices for Science Program**
Selected to be part of the AGU Voices for Science fourth cohort (2021-2022) (blogs.agu.org/sciencecommunication/hisham-eldardiry/).

## ACADEMIC SERVICES AND LEADERSHIP

- **NASA SWOT Early Adopter**
  *Leading the Early Adopter (EA) team of Alexandria University (Egypt) to integrate Surface Water and Ocean Topography (SWOT) Mission into hydrologic applications [2022-Present].*

- **PNNL Internship Mentor**
  *Student: Md Abu Bakar Siddik (Major: Civil and Environmental Engineering, Virginia Tech) [2022].*

- **AGU Precipitation Technical Committee**
  *Member of the AGU Precipitation Technical Committee [2018-2022].*

- **Nile Talk Forum**

*Invited moderator for Nile Talk Forum organized by the Institute of Environment at the Florida International University [April 2021].*

- **PhD Advisory Committee Member**
  *Student: Hanz Unruh (Major: Systems Engineering, University of Louisiana at Lafayette) [2021].*

- **Sensing Rivers Workshop (SR 2020)**
  *Organizing a 3-day virtual workshop on satellite remote sensing applications in water resources management (September 21-23, 2020). Recordings are available on [YouTube](#).*

- **CUASHI Virtual Forum**
  *Invited panelist for CUASHI Virtual Forum: Transitioning to Online Education, Graduate Student Panel [2020].*

- **African Development Bank Ideathon**
  *Participating in Africa vs Virus Ideathon Challenge (organized by the African Development Bank) to support teams developing solutions for Education in Africa during COVID-19 [2020].*

- **AGU Fall Meeting Mentoring Program**
  *Participant of the AGU Fall Meeting Mentoring Program (FMMP) to mentor first-time authors for Fall Meeting abstract submission*

- **Elsevier Advisory Panel**
  *Member of Elsevier Advisory Panel [2018-2020]*

- **Nile Dialogue Series**
  *Co-organizer of a biweekly Dialogue Series on Water Management Challenges in the Nile River Basin, (Department of Hydraulic Engineering, Alexandria University, Egypt) [2016-2017].*

- **Designing Leader Program**
  *Selected to attend the Designing Leader Program at the University of Louisiana at Lafayette, College of Engineering, USA [2016].*

- **Peer Reviewer**
  *Journal of Hydrology - Journal of Hydrometeorology - Proceedings of the National Academy of Sciences - IEEE Geoscience and Remote Sensing Letters - Journal of Hydrologic Engineering - Remote sensing of Environment - Geoscience and Remote Sensing Letters - Water Resources Management - Earth Systems and Environment - Journal of Stochastic Environmental Research and Risk Assessment.*

## TECHNICAL SKILLS

- **Programming**: Python, R, Matlab, Fortran, C, VBA, Shell Scripting.
- **Source Code Management (SCM):** GitHub
- **High Performance Computing (HPC):** National Energy Research Scientific Computing Center (NERSC), PNNL Platforms (Constance and Deception)
- **Geographic Information System (GIS):** ArcMap, QGIS, GDAL.
- **Hydraulic and Hydrological Modeling:** VIC, MOSART, WMS, HEC-RAS, HEC-HMS, NOAA/NWS-HL Distributed Hydrological Modeling- NOAA/NWS/Community Hydrologic Prediction System (CHPS).
- **Power System Modeling:** PowNet.
- **Earth System Modeling:** Community Earth System Model (CESM).
- **Numerical Weather Prediction (NWP) Systems:** Weather Research and Forecasting (WRF) Model.
- **Machine Learning Techniques:** Regression, Artificial Neural Networks, Deep Learning.

- **Computational Notebooks:** Jupyter notebooks, Google Colab.
- **Cloud Computing:** Google Earth Engine (GEE)
- **Web Development:** HTML, JavaScript, CSS
- **Computer Aided Drawing (CAD):** AutoCAD
- **Structural Analysis and Design:** SAP, STAAD.
- **Analysis of Engineering Systems**: ARENA, Lean Six Sigma tools.

## PROFESSIONAL EXPERIENCE

**2013-2016**    **Hydraulic and Hydrologic (H&H) Engineer**
Statewide Flood Control Program in Louisiana
Department of Transportation and Development (DOTD), Louisiana, USA.
*Supervisor: Dr. Emad Habib, PE*

**2012-2016**    **Hydraulic and Hydrologic (H&H) Engineer**
Flood Control Management in Al-Zulfi City, Riyadh Province, Saudi Arabia
Engineering Consulting Office (ECO), Alexandria, Egypt.
*Supervisor: Dr. Alaa Yassin*

**2011-2012**    **Military Engineer**
Engineering Authority of Egyptian Armed Forces, Cairo, Egypt.
*Chief: Colonel Engineer Tarek Abdel-Aleem*

**Structural Engineer**
**2009-2010**    Design of Reinforced Concrete Structures for Neece Resort in North Coast of Egypt
*Supervisor: Dr. Ahmed Tarabia*

## PROFESSIONAL ASSOCIATIONS MEMBERSHIP

- American Society of Civil Engineers (ASCE).
- American Geophysical Union (AGU).
- American Meteorological Society (AMS).
- American Water Resources Association (AWRA).
- The Honor Society of Phi Kappa Phi.
- Egyptian Engineers Syndicate (EES).

## LANGUAGES (ILR SCALE)

- **Arabic:** Native proficiency.
- **English:** Professional working proficiency.
- **French and Spanish:** Limited working proficiency.