JORGE A. GUZMAN, PH.D. e-mail : jag@illinois.edu
Visiting Research Programer
Agricultural and Biological Engineering, University of Illinois, Urbana-Champaign
HTTPS://ORCID.ORG/0000-0002-7734-5723

EDUCATION:

- Ph.D. Biosystems and Agricultural Engineering, Oklahoma State University, Stillwater, OK, USA 2010. Dissertation: *Soil pathogen fate and transport: Biopore-facilitated Escherichia coli transport.*
- Master of Science in Hydrology and Water Resources, UNESCO-IHE, Delft, The Netherlands, 2003. Thesis: *Runoff processes simulation in the hillslope catchment of Terzieterbeek, Limburg*
- Master of Science in Computer Science, Universidad Industrial de Santander, Bucaramanga, Colombia, 1994. Thesis: *Software development for design of open water distribution networks (CAE)*.
- Diploma in Photogrammetry and Large scale DEMs for Civil Engineering, IGAC, Bogotá, Colombia
- B.S. Civil Engineering, Universidad Industrial de Santander, Bucaramanga, Colombia

PROFESSIONAL EXPERIENCE/EXPERTISE:

My expertise encompasses the analysis of physical, chemical and biological processes linked to surface and subsurface water interactions driven by anthropogenic and natural stressors. Academic and administrative experience serving as associate professor, and department chairperson in the "Universidad Industrial de Santander".

POSITIONS:

2018-Present: Visiting Research Programmer, Department of Agricultural and Biological Engineering, University of Illinois, Urbana-Champaign. Advancing the use of flow cytometry to identify and characterize mineral composition in soil particles.

2016-2018: Postdoctoral Researcher, Center for Spatial Analysis, University of Oklahoma, Norman, Oklahoma. Assessing and quantify the impacts of climate variability and change in rural and urban areas while advancing the development of distributed environmental models that can take advantage of Earth observations to assess long-term impacts in water quantity and quality.

2014-2016: Senior Engineer, Waterborne Environmental, Inc., Champaign, Illinois. Support the modeling group and leading tasks on hydrologic, environmental, statistical modeling, transport phenomena, and model evaluation and performance within projects for clients like Syngenta and the Illinois Corn Grower Association.

2011-2014: Research Hydrologist - Postdoctoral Fellow, USDA-ARS Grazinglands Research Laboratory, El Reno, Oklahoma. Surface-groundwater investigation in the Fort Cobb Reservoir Experimental Watershed (FCREW) in Oklahoma. Developed a modeling framework integrating the SWAT, MODFLOW, and ET Energy Balance models. Development of a methodology for conducting global sensitivity and uncertainty analysis, support field data collection (groundwater, soil, and meteorological variables), deployment of automated water samplers in the Fort Cobb and Little Washita watersheds, and development of groundwater monitoring wells in the FCREW in cooperation with USEPA. GS-1315-11: October 2011 to March 2014. GS-1315-12: March 2014 to September 2014.

2007-2010: Graduate Research Associate, Department of Biosystems and Agricultural Engineering, Oklahoma State University, Stillwater, Oklahoma. Conduct research, develop reports and publications, and assist in grant writing for future funding on soil pathogen transport; Led research team including Master of Science and undergraduate students on this research project; Assisted in field projects on contaminant transport by preferential flow.

1991-2007: Faculty member, Civil Engineering Department, Universidad Industrial de Santander, Bucaramanga, Colombia. Faculty member with 100% teaching appointment; Served as the Civil Engineering Department Chairman and as part of the Civil Engineering Department council and College of Engineering council; Chairman of the civil engineering department accreditation board; Extension supervisor on water distribution projects for small communities; Hydrologic consultant for private and government agencies.

GRANTS:

NIFA-AFRI-FACT (2018): Untangling the dynamics of sediment production through the confluence of data, hydro-ecologic, and decision analytics for a sustainable agro-production system. Role: Co-PI ($ 499,999). Start date: August 2019.

PROFESSIONAL ORGANIZATIONS:

2007-present. Member of the American Society of Biological and Agricultural Engineers (ASABE)
2011-present. Member of the Soil and Water Conservation Society
2011-2014. Member of the Soil Science Society of America
2012 – 2015. ASABE member of the SW-03 Standards Committee. This committee coordinates standards development and reviews standards projects within the scope of the division.

AWARDS AND RECOGNITION:

2015 Outstanding contribution in reviewing for the *Journal of Environmental Modelling and Software*.
2013 ASABE superior paper award: Implementation of Biopore and soil fecal bacteria fate and transport routines in the Root Zone Water Quality model (RZWQM)
2013 Certificate of appreciation in recognition of outstanding service as a reviewer in the soil and water division for an ASABE journal.
2012 USDA certificate of merit 2011-2012
2010 Named a 2009 outstanding reviewer by the *Journal of Environmental Quality*
2009 Second place for oral presentation at the Oklahoma State University research symposium. OSU, Research Week, Stillwater, OK, Feb 16-20, 2009.
2007 Graduate Research Assistant for a United States Department of Agriculture (USDA), Cooperative State Research, Extension, and Education Service (CSREES) National Research Initiative Grant, Award no. 2007-35102-18242.
2001 Recipient of the COLFUTURO assistantship program. Bogota, Colombia.
Graduated with honors for the final project at the Bachelor of Science in Civil Engineering.

AUTHORED SOFTWARE AND APPLICATIONS:

- vCFSgrinder: Visualization and analysis of Flow Cytometry Data
- StormG: Synthetic hurricane storm generator
- Soil fecal bacteria transport and biopore concept for RZWQM
- NAM-ghp: Conceptual hydrological rainfall-runoff model
- Spell-Stat : Hydrological time series analysis for screening hydrological data
- SPELLmap: Grid visualization and spatiotemporal analysis
- BSF: Base flow separation
- SWATmf: coupled SWAT and MODFLOW models
- ZEUS: synthetic rainfall generator

PEER-REVIEWED PUBLICATIONS:

28. **Guzman, J.A.**, M.L., Chu, J.L. Steiner, P.J., Starks. 2018. Assessing and quantifying changes in precipitation patterns using event-driven analysis. 2018. *J. Hydrol. Regional Studies*, 15: 1-15.
27. Chu, M.L., **J.A. Guzman**, M.B. Villamil. 2018. A Modeling Framework to Evaluate the Impacts of Future Climate on Soil Organic Carbon Dynamics. *J. Environ Qual*, 47(4): 596-606.
26. Prada, A.F., M.L. Chu, **J.A. Guzman**, D.N. Moriasi. 2017. Evaluating the impacts of agricultural land management practices on water resources: a probabilistic hydrologic modeling approach. *J. Environ. Management*, 193: 512-523.
25. Botero-Acosta, A., M.L. Chu, **J.A. Guzman**, P.J. Starks, D.N. Moriasi. 2017. Riparian erosion vulnerability model based on environmental features. *J. Environ. Management*, 203(1): 592-602
24. Moriasi, D.N.,K. King, D. Bosh, D. Bjorneberg, S. Teet, **J.A. Guzman**, M. Williams. Framework to parameterize and validate APEX to support deployment of the nutrient tracking tool. *Agricultural Water Management*, 177: 146-164
23. Moriasi, D.N., R.W. Zeckoski, J.G. Arnold, C.B. Baffaut, R.W. Malone, P. Daggupati, **J.A. Guzman**, D. Saraswat, Y. Yuan, B.W. Wilson, A. Shirmohammadi, and K.R. Douglas-Mankin. 2015. Hydrologic and water quality models: key calibration and validation topics. *T. ASABE 58(6): 1609-1618*
22. **Guzman, J.A.**, A. Shirmohammadi, A. Sadeghi, X. Wang, M.L. Chu, M.K. Jha, P. Parajuli, D. Harmel, Y. Khare, and J. Hernandez. 2015. Uncertainty considerations in calibration and validation of hydrologic and water quality models. *T. ASABE 58(6): 1745-1762*
21. Baffaut, C., S.M. Dabney, M. Smolen, M.A. Youssef, J.V. Bonta, M.L. Chu, **J.A. Guzman**, V. Shedekar, M. K. Jha, and J.G. Arnold. 2015. Hydrologic and water quality modeling: spatial and temporal considerations. *T. ASABE 58(6): 1661-1680*
20. **Guzman, J.A.**, D.N. Moriasi, P.H. Gowda, J.L. Steiner, J.G. Arnold, and R. Srinivasan P.J. Starks. 2015. A model integration framework for linking SWAT and MODFLOW. 2015. *J. Environ. Modeling & Software,* 73: 103-116. DOI: 10.1016/j.envsoft.2015.08.011
19. Steiner, J.L., P.J., Starks, J.D., Garbrecht, D.N., Moriasi, X., Zhang, J.M., Schneider, **J.A.**, **Guzman,** and E., Osei, 2014. Long-Term Environmental Research: The Upper Washita River Experimental Watersheds, Oklahoma, USA. *J Environ Qual*. 43(4): 1227-1238. doi:10.2134/jeq2014.05.0229
18. Starks, P.J., C.A. Fiebrich, D.L. Grimsley, J.D. Garbrecht, J.L. Steiner, **J.A. Guzman**, and D.N. Moriasi. 2014. Upper Washita River experimental watersheds: Meteorologic and soil climate measurement networks. *J. Environ. Qual*. 43(4): 1239-1249. doi:10.2134/jeq2013.08.0312
17. **Guzman, J.A**., M.L. Chu, P.J. Starks, D.N. Moriasi, J.L. Steiner, C.A. Fiebrich, and A.G. McCombs. 2014. Upper Washita River experimental watersheds: Data screening procedure for data quality assurance. *J. Environ. Qual.* 43(4): 1250-1261. doi:10.2134/jeq2013.08.0325
16. Moriasi, D.N., P.J. Starks, **J.A. Guzman**, J.G. Garbrecht, J.L. Steiner, J.C. Stoner, P.B. Allen, and J.W. Naney. 2014. Upper Washita River Experimental Watersheds: Reservoir, groundwater, and stream flow data. *J. Environ. Qual.* 43(4): 1262-1272. doi:10.2134/jeq2013.08.0329
15. Starks, P.J., J.L. Steiner, D.N. Moriasi, **J.A. Guzman**, J.D. Garbrecht, P.B. Allen, and J.W. Naney. 2014. Upper Washita River experimental watersheds: Nutrient water quality data. *J. Environ. Qual.* 43(4): 1280-1297. doi:10.2134/jeq2013.08.0309
14. Moriasi, D.N., P.J. Starks, J.L. Steiner, **J.A. Guzman**, P.B. Allen, and J.W. Naney. 2014. Upper Washita River experimental watersheds: Physiography data. *J. Environ. Qual.* 43(4): 1298-1309. doi:10.2134/jeq2013.08.0337
13. Cosh, M.A., P.J. Starks, **J.A. Guzman**, and D.N. Moriasi. 2014. Upper Washita experimental watersheds: Multiyear stability of soil water content profiles. *J. Environ. Qual.* 43(4): 1328-1333. doi:10.2134/jeq2013.08.0318

12. Moriasi, D.N., **J.A. Guzman**, J.L. Steiner, P.J. Starks, and J.D. Garbrecht. 2014. Seasonal sediment and nutrients transport patterns. *J. Environ. Qual.* 43(4): 1334-1344. doi:10.2134/jeq2013.11.0478
11. Chu, M.L., **J.A. Guzman**, R. Muñoz-Carpena, G.A. Kiker, and I. Linkov. 2014. A simplified approach for simulating changes in beach habitat due to the combined effects of long-term sea level rise, storm erosion, and nourishment. *J. Environ. Modeling & Software* 52: 111-120. http://dx.doi.org/10.1016/j.envsoft.2013.10.020
10. **Guzman, J.A**, D.N., Moriasi, M.L., Chu, P.J., Starks, J.L., Steiner, and P.H., Gowda. 2013. A tool for Mapping and Spatio-temporal Analysis of Hydrological Data. *J. Environmental Modeling & Software* 48: 163-170. http://dx.doi.org/10.1016/j.envsoft.2013.06.014
09. Chu, M.L., J., Knouft, A., Ghulam, **J.A., Guzman**, and Z., Pan. 2013. Impacts of urbanization on river flow frequency: A controlled experiment modeling-based evaluation approach. *J. Hydrol.* 495: 1-12. http://dx.doi.org/10.1016/j.jhydrol.2013.04.051
08. Fox, G.A., M.M., Marvin, **J.A., Guzman**, C.K., Hoang, R.W., Malone, R.S., Kanwar, and M.J., Shipitalo. 2012. *E. Coli* Transport Through Surface-Connected Biopores Identified From Smoke Injection Test. *T. ASABE*. 55(6) 2185-2194.
07. Meek, D.W., C., Hoang, R.W., Malone, R.S., Kanwar, G.A., Fox, and **J.A., Guzman.** 2012. Rational Polynomial Functions for Modeling *E. Coli* and Bromide Breakthrough. *T. ASABE.* 55(5): 1821-1826.
06. **Guzman, J.A.**, G.A., Fox, and C., Penn. 2012. Sorption of *Escherichia coli* in agricultural soils influenced by swine manure constituents. *T. ASABE* 55(1): 61-71.
05. **Guzman, J.A.**, G.A., Fox. 2012. Implementing Biopore and Fecal Bacteria Fate and Transport Routines into the Root Zone Water Quality Model (RZWQM). *T. ASABE* 55(1): 73-84.
04. Fox, G.A., E.M., Matlock, **J.A., Guzman**, D., Sahoo, and K.B., Stunkel. 2011. *Escherichia coli* Load Reduction from Runoff by Vegetative Filter Strips: A Laboratory-Scale Study. *J. Environ. Qual.* 40(3):980-988
03. **Guzman, J.A.**, G.A., Fox, and J., Payne. 2010. Surface runoff transport of *Escherichia coli* after poultry litter application on pastureland. *T. ASABE* 53(3): 779-786
02. **Guzman, J.A.**, G.A., Fox, R.W., Malone, and R.S., Kanwar. 2009. *Escherichia coli* transport from surface applied manure to subsurface drains through artificial biopores. *J. Environ. Qual.* 38(6):2412-2421
01. Garbrecht, K., G.A., Fox, **J.A. Guzman**, and D., Alexander. 2009. *E. coli* transport through soil columns: Implications for bioretention cell removal efficiency. *T. ASABE* 52(2):481-486.

MANUSCRIPTS IN REVISION

- Beyond Model Metrics: The Perils of Calibrating Hydrologic Models in One Domain. *J. Hydrol*

CONFERENCE PROCEEDINGS (> 4 PAGES):

13. Botero, A., M.L. Chu, **J.A. Guzman**. 2016a. Assessing vulnerability to erosion: an integration of hydrologic and habitat suitability models. XII Latin American and Caribbean Congress of Agricultural Engineers, Bogotá, Colombia, May 23-27, 2016.
12. Botero, A., M.L. Chu, **J.A. Guzman**. 2016b. Riparian erosion suitability model based on environmental features. ASABE Annual International Meeting, Orlando, FL, July 17 – 20, 2016
11. Huo, C., M.L. Chu, **J.A. Guzman**. 2016. NexRad N1P data and ground-based rainfall time series comparison in Little Washita Watershed. ASABE Annual International Meeting, Orlando, FL, July 17 – 20, 2016
10. Prada, A., M.L. Chu, **J.A. Guzman**. 2016. Probabilistic approach to modeling under changing scenarios. ASABE Annual International Meeting, Orlando, FL, July 17 – 20, 2016.

09. Prada, Andres, M.L. Chu, **J.A. Guzman**, D. Moriasi, K.W. King, D. Bosch, D. Bjorneberg, S. Teet. 2015. Uncertainty and equifinality driven by rainfall in the APEX model. ASABE Paper No. 2188857, St. Joseph, Mich.: ASABE.
08. **Guzman, J.A.**, D.N. Moriasi, P.H. Gowda, P.J. Starks, J.L. Steiner, and A.L. Verser. 2013. Integrated SWAT-MODFLOW modeling framework: Modeling multiple disconnected surface watersheds on a single subsurface aquifer system. In: Proceeding, MODFLOW and More 2013: Translating Science into Practice, Golden, CO. 2–5 June 2013. ttp://igwmc.mines.edu/conference/abstracts/04_Guzman.pdf
07. **Guzman, J.A**., D.N. Moriasi, P.H. Gowda, J.L. Steiner, J.G. Arnold, R. Srinivasan, and P.J. Starks. 2012. An integrated hydrologic modeling framework for coupling SWAT with MODFLOW. In: 2012 International SWAT Conference Proceedings, New Delhi, India. 16–20 July 2012. p. 446–455
06. **Guzman**, **J.A.,** D.N. Moriasi, P.H. Gowda, J.L. Steiner, J.G. Arnold, R. Srinivasan, and P.J. Starks. 2012. A Fully Integrated SWAT-MODFLOW Hydrologic Model. ASABE 2012 international meeting.
05. **Guzman**, **J.A.,** D.N. Moriasi, P.H. Gowda, J.L. Steiner, J.G. Arnold, R. Srinivasan, T.A. Howell, and P.J. Starks. 2012. A Conceptual Integrated Modeling Framework for Groundwater Management. SSSA international meeting. Symposium Evapotranspiration: Monitoring, Modeling and Mapping At Point, Field, and Regional Scales: I
04. **Guzman, J.A.**, G.A. Fox, J. Payne. Surface runoff transport of *E. coli* after poultry litter application on pastureland: Field experiments. ASABE Paper No. 1008728, Pittsburgh, PA: Jun 20-23, 2010.
03. **Guzman, J.A.**, G.A., Fox, C. Penn. Sorption of *E. coli* from liquid swine manure in natural and artificial soils. ASABE Paper 096239, Reno, NV: Jun 21-24, 2009.
02. **Guzman, J.A.**, G.A., Fox. The Role of Drainage System and Macropore Interconnectivity in Soil Pathogen Transport. ASABE, Providence, RH: Jun 29-Jul 2, 2008.
01. Fox, G.A., R. Kanwar, **J.A. Guzman**, C.K. Hoang, R.W. Malone, T. Moorman and C. Pederson. *E. coli* Fate and Transport in Macroporous Soils: Short-Circuiting to the Subsurface. ASCE, Honolulu, HI: May 12-16, 2008.

CONFERENCE ORAL/POSTER PRESENTATIONS:

Prada, Andres, M.L. Chu, **J.A. Guzman**, D. Moriasi, K.W. King, D. Bosch, D. Bjorneberg, S. Teet. 2015. Uncertainty and equifinality driven by rainfall in the APEX model. ASABE Annual International Meeting, New Orleans, LA, July 26 – 29, 2015.

H.M. Skibstead, D.N. Moriasi, J.L. Steiner, P.J. Starks, **J.A. Guzman**, and J.A. Verser. The Effects of Land Use Changes and Climate Variability on Reservoir Sedimentation for the Little Washita River Experimentation Watershed. SWCS International Annual Meeting, Greensboro, NC. July 26-29, 2015.

Guzman, J.A., D. Moriasi, P. Gowda, J. Steiner, P. Starks, J. Arnold, R. Srinivasan. A model integration framework for assessing surface and subsurface water interaction. SWCS International Annual Meeting Lombard, IL. July 27-30, 2014.

Guzman, J.A., A. Shirmohammadi, A. Sadeghi, X. Wang, M.L. Chu, M.K. Jha, P. Parajuli, D. Harmel, Y. Khare, J. Hernandez. Uncertainty considerations in calibration and validation of hydrologic and water quality models. ASABE-CSBE Annual International Meeting Montreal, Canada. July 13-16, 2014.

Guzman, J.A., P.H. Gowda, D.N. Moriasi, G. Paul, P.J. Starks, and J.L. Steiner. Estimated distributed percolation fluxes from energy balance ET, surface and groundwater model integration. ASABE International Evapotranspiration Symposium Raleigh, NC. April 6-9, 2014.

Guzman, J.A., D.N. Moriasi, P.J. Starks, J.L. Steiner, P.H. Gowda, and M.L. Chu. SPELLmap: Mapping and Analysis Tools for Spatial Time Series and Spatially Distributed Data. National Weather Center at University of Oklahoma; GIS day. Nov. 14, 2012

Guzman, **J.A.,** D.N. Moriasi, P.J. Starks, J.L. Steiner, P.H. Gowda, and M.L. Chu-Agor. SPELLmap: An application tool for handling large georeferenced hydrological datasets. Soil and Water Conservation Society annual meeting; Deep and Silent Waters Symposium, Jul 22-25, 2012 Fort Worth, TX

Chu-Agor, M.L., **J.A. Guzman**, G.A. Kiker, R. Muñoz-Carpena, and I. Linkov. Quantifiying the changes in beach habitat due to long-term sea level rise, storm erosion, and re-nourishment. State University System Climate Change Workshop. UFL, Gainesville, FL. Nov 14-14 2011.

Chu-Agor, M.L., **J.A. Guzman**, G.A. Kiker, R. Muñoz-Carpena, and I. Linkov. Quantifiying the changes in beach habitat due to long-term sea level rise, storm erosion, and re-nourishment. Southest Climate Consortium. 2011 Fall Planning Meeting. Tallahassee, FL. Nov 2-4 2011.

Guzman J.A., G.A Fox, and J. Payne. Surface Runoff Transport of *E. coli* after Poultry Litter Application on Pastureland: Field Experiments. OWRRI, Oklahoma City, OK: Nov 3-5, 2009

Guzman, J.A. and G.A. Fox. Macropore Flow and Subsurface Drain Interconnectivity: *E. coli* Transport Experiments. ASCE, EWRI-Kansas City, MO: May 17-21, 2009.

Guzman, J.A., G.A. Fox, R.W. Malone, and R. Kanwar. Laboratory Study on *Escherichia coli* Transport to Subsurface Drains through Directly Connected Biopores. OSU, Research Week, Stillwater, OK: Feb 16-20, 2009.

Guzman J.A., G.A Fox, R. Kanwar, R. Malone, T. Moorman, C.K. Hoang, and C. Pederson. Role of Directly Connected Macropores in the Transport of *E. coli* to Subsurface Drainage. USDA, NWC-St. Louis, MO: Feb 08-12, 2009

Guzman J.A., G.A Fox. Transport of *E. coli* by biopores and mesopores: A Rapid Pathway to the Subsurface. OWRRI, Oklahoma City, OK: Oct 28-30, 2008