Orozco-López, **Enrique**

PhD in Agricultural and Biological Engineering - Hydrologic Modeling and Water Quality

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Education

Jan. 2017 - Jun. 2020. Ph.D. in Agricultural and Biological Eng. - Hydrologic Modeling and Water Quality

Agricultural and Biological Engineering Department, University of Florida, USA

- Dissertation: subsurface preferential flow and transport in riparian buffers. Developed and programmed flow and transport numerical models to test measurements from field (Kenya) and laboratory experiments.
- GPA of 3.93 out of 4.00. Main courses: numerical methods for engineering analysis, vadose zone modeling, statistical machine learning, stochastic modeling, biological systems modeling.

Oct. 2015 - Oct. 2016. MSc in Environmental Hydraulics: Major in Integrated Catchment Management.

Earth System Interuniversity Institute, CEAMA. University of Granada and University of Córdoba, Spain

- Best M.Sc. Thesis Award.
- Grades 8.7 out of 10. Main courses: integrated catchment management, dynamics of biogeochemical fluxes, mixing and transport, and erosive and geomorphological processes.
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Sep. 2007 - Jun. 2010. B.Eng. Industrial Engineering Technician, Speciality in Chemical Engineering

UPCT (Polytechnic University of Cartagena), Spain

- Final project performed in France, granted by European Union Erasmus Scholarship.
- Main courses: fluid mechanics, heat transfer, and organic, inorganic, bio-, and analytical, chemistry.

Experience

Jan. 2022 - Currently. Postdoctoral Researcher

Center for Coastal Solutions. University of Florida, USA

- Researching hydrologic modeling and artificial intelligence applied to water resources and quality. Developing attention-based neural networks for multivariate time series forecasting, and improving the efficiency of SWAT hydrologic model in the Caloosahatchee, Peace, and Myakka watersheds, Florida, through neural networks optimization.

Jan. 2021 - Dec. 2021. Postdoctoral Associate

Northern Gulf Institute (NOAA collaborative institute). NASA Stennis Space Center, USA

- Investigated artificial intelligence applied to hydrologic modeling and water quality. Focus on recurrent and cutting-edge attention-based neural networks for multivariate time series forecasting. Developed algorithms for multi-output salinity forecasting in the Mississippi Sound.

Jan. 2017 - Aug. 2020. Graduate Research Assistant

Agricultural and Biological Engineering Department, University of Florida, USA

- Conducting subsurface preferential flow experiments in a riparian buffer (Kenya) using dielectric methods to measure soil water-redistribution dynamics and numerical modeling of kinematic wave based equations.
- Conducting contaminant fate and transport laboratory experiments using the light transmission method in a 2D flow chamber, dye tracers, 3D printed preferential pathways, Mariotte syphons, spectrophotometer, image post-processing and analysis, and numerical modeling of convective-dispersive based equations.

Jan. 2018 - Jun. 2018. Teaching Assistant

Agricultural and Biological Engineering Department, University of Florida, USA

- Assisting and teaching in Dr. Rafael Muñoz-Carpena undergraduate course (4ct. hours): land and water resources engineering.

Jan. 2015 - Sep. 2015. Production Technician

Derivados químicos, Infa group, Spain

- Leader of the operations team under the supervision of the synthesis plant chief in a fine chemistry manufacturer.
- Supervising production operations and schedules. Experience with hazardous chemicals, piping systems and heavy chemical equipment, such as reactors, condensers, and centrifuges.

Oct. 2010 - May. 2011. Research and Development technician

Institute for composite materials (Institute Für Verwundwerkstoffe), Germany

- Conducted synthesis, characterization and modification of hybrid thermosetting resins for piping protection and isolation. Teaching and supervising students on laboratory procedures and techniques.
- Internship granted by European Union Leonardo da Vinci Scholarship.

Journal Publications

[1] **Orozco-López, E.,** A.C., Linhoss, and D. Bernstein, E. (in preparation). Encoder-decoder LSTM with Attention neural network for multivariate time series forecasting. Case scenario for multi-output salinity forecasting in the Mississippi Sound

[2] **Orozco-López, E.,** R. Muñoz-Carpena, and B. Gao. (in preparation). Pore-scale preferential solute transport laboratory experiments with dyed solutions and modeling.

[3] **Orozco-López, E.,** and R. Muñoz-Carpena. 2021. Field-scale subsurface preferential flow in a riparian buffer: experimental observations and comparative model approaches. Transactions of the ASABE. 64(6):1867-1881 doi: 10.13031/trans.14559.

[4] **Orozco-López, E.,** R. Muñoz-Carpena, B. Gao., and G.A. Fox. 2021. High-resolution pore-scale water content measurement in a translucent soil profile from light transmission. Transactions of the ASABE. 64(3):949-962. doi: 10.13031/trans.14292

[5] **Orozco-López, E.,** R. Muñoz-Carpena, B. Gao, and G.A. Fox. 2018. Riparian vadose zone preferential flow: Review of concepts, limitations, and perspectives. Vadose Zone J. 17:180031. doi:10.2136/vzj2018.02.0031

Proceedings

[1] **Orozco-López, E.,** R. Muñoz-Carpena, and B. Gao. 2019. Impact of preferential flow on contaminant transport through riparian buffers I: field experiments (in spanish). Estudios en la Zona no Saturada del Suelo Vol. XIV. ZNS'19.

[2] **Orozco-López, E.,** R. Muñoz-Carpena, and B. Gao. 2019. Impact of preferential flow on contaminant transport through riparian buffers II: laboratory experiments (in spanish). Estudios en la Zona no Saturada del Suelo Vol. XIV. ZNS'19.

[3] **Orozco-López, E.,** R. Muñoz-Carpena, and B. Gao. 2017. Preferential flow and transport in riparian vadose zone: review (in spanish). Estudios en la Zona no Saturada del Suelo Vol. XIII. ZNS'17.

Presentations

[1] **Orozco-López, E.,** LSTM withAttention neural network for multivariate time series forecasting. Case scenario formulti-output salinity forecasting in the Mississippi Sound. Poster presentation. AGU Congress. Dec. 2021.

[2] **Orozco-López, E.,** R. Muñoz-Carpena, and B. Gao. Subsurface preferential flow in riparian buffers: field experiments. Oral presentation. ASABE Conference. Jul. 2020.

[3] **Orozco-López, E.,** R. Muñoz-Carpena, and B. Gao. Subsurface preferential flow and transport in riparian buffers: laboratory experiments. Poster presentation. Water Institute Symposium. University of Florida. Feb. 2020.

[4] **Orozco-López, E.,** R. Muñoz-Carpena, B. Gao, and G.A. Fox. Preferential flow through riparian vadose zone: experimental framework. Poster presentation. 99th American Geophysical Union Fall Meeting. Washington, D.C. Dec. 2018

[5] **Orozco-López, E.,** R. Muñoz-Carpena, B. Gao, and G.A. Fox. Preferential flow through riparian vadose zone: literature Review. Poster presentation. Water Symposium, University of Florida, March 2018. **Best Poster Award.**

Scholarships and Awards

2018	**Ken and Cindy Campbell Travel Scholarship.** PhD dissertation research in Nanyuki, Kenya.
2017-2020	**USDA-NIFA Ph.D. Scholarship.** PhD dissertation in University of Florida, USA.
2018	**Best Poster Award.** Water Institute Symposium, University of Florida, USA.
2016	**Best MSc Thesis Award.** MSc in Environmental Hydraulics.
2010-2011	**European Union Leonardo da Vinci's Scholarship.** Research internship.
2009-2010	**European Union Erasmus Scholarship.** Conducted Bachelor's final project.

Software Skills

Modeling	**Python, MATLAB** R, C++, Basic
Geospatial	**ArcGIS**
Hydro-IT	**SWAT, Chemflow, Hydrus 1D**
3D print	**SolidWorks,** Ultimaker Cura
Drawing	**Autodesk Sketchbook,** Sketchup
Office	**LaTeX, Microsoft Office**

Leadership and Associative Experience

2019-2020	**President.** American Water Resources Association (AWRA) University of Florida Chapter.
2020	**Organization team member.** Water Symposium Career Fair, University of Florida.
2020	**Organization team member.** Agricultural and Biological Eng. Dept. Career Fair, UF.
2019-2020	**Design team member.** Engineers Without Borders UF chapter, University of Florida.
2019-Present	**Member.** Alpha Pi Honor Society, University of Florida.
2017-Present	**Member and Peer-reviewer.** American Society of Agricultural and Biological Engineers.
2017-2019	**Editor's Club Coordinator.** Peer-review training with Journal of Hydrology Regional Studies.
2022-Present	**Volunteer,** Disaster Action Team, American Red Cross, Gainesville, Florida.
2017-2019	**Volunteer,** Habitat for Humanity, Gainesville, Florida.
2017-2019	**Mentor.** Graduate Student Organization. University of Florida.
2016	**Students' representative.** MSc in environmental hydraulics. University of Córdoba, Spain.
2015-2016	**Internal quality committee member.** University of Granada, Spain.

Language Skills

Spanish	**Native**
English	**Fluent**
German	**Basic**
French	**Basic**