Luis Alejandro Morales-Marín

Education

2008–2013 **PhD.**, *University College London (UCL)*, London, United Kingdom, *Grade*.
Doctor of Philosophy in Physical Geography (Major in water resources)

2004–2007 **MSc.**, *Universidad Nacional de Colombia*, Bogotá, Colombia, *Grade*.
Master of Science in Water Resources Engineering

2002–2003 **Spe.**, *Escuela Colombiana de Ingeniería "Julio Garavito"*, Bogotá, Colombia, *Grade*.
Specialist in Water Resources and Environment

1997–2002 **BEng.**, *Escuela Colombiana de Ingeniería "Julio Garavito"*, Bogotá, Colombia, *Grade*.
Bachelor in Civil Engineering

Research Interest

Effects of climate and land-use changes on hydrological processes in river catchments.

Water quality and hydrological modelling in river catchments.

Catchment and in-stream nutrient and sediment transport modelling and management.

Large-scale hydrological modeling and land surface processes.

Professional appointments

Jul 2018–current **Research Associate**, *Global Institute for Water Security and Global Water Future Program, National Hydrology Research Centre, University of Saskatchewan*, Saskatoon, Canada.
Research associate in water quality and hydrological modelling in river catchments.

May 2013–Jun 2018 **Postdoctoral Research Fellow**, *Global Institute for Water Security, National Hydrology Research Centre, University of Saskatchewan*, Saskatoon, Canada.
Postdoctoral Researcher in nutrient and sediment transport and large scale hydrological modeling.

April 2013 - Current **Invited Lecturer in River Science course**, *Global Institute for Water Security and School of Environment and Sustainability, University of Saskatchewan*, Saskatoon, Canada.
Implementation and evaluation of nutrient transport models in river catchments.

August 2008 - March 2012 **Graduate Assistant**, *University College London (UCL)*, London, United Kingdom.
IT assistant in the UNIX/LINUX laboratory. Support for UNIX/LINUX platforms and programming in Fortran, C and Matlab languages. Installation and support of specialized software in water resources such as: SWAN, SWAT and MIKE SHE. Preparation of explanatory manuals and documentation.

Global Institute for Water Security, National Hydrology Research Centre, 11 Innovation Boulevard Saskatoon SK – S7N 3H5
☎ *1 306 966 7243* • FAX *1 306 966 1193* • ✉ *luis.marin@usask.ca, lmoralesma@gmail.com*

January 2006 - June 2006 **Lecturer in Hydraulic Structures**, *Universidad Distrital Francisco Jose de Caldas*, Bogotá, Colombia.
Lectures on design of water drainage systems and water supply structures. Lectures delivered to two groups of 30 students each; handouts and computational programs were provided to students.

January 2004 - March 2006 **Hydraulic Engineer**, *Aguazul Consulting S.A.*, Bogotá, Colombia.
Design of sewer and aqueduct networks for new housing developments in Bogotá, Colombia. Revision and design of urban drainage systems.

January 2004 - March 2006 **Supervision Engineer**, *Aguazul Consulting S.A.*, Bogotá, Colombia.
Technical and quality control of sewer and aqueduct networks in new housing developments in Bogotá. Revision of water drainage and waste-water system designs.

January 2003 - December 2003 **Assistant Engineer**, *Aguazul Consulting S.A.*, Bogotá D.C, Colombia.
Assistance during the supervision of hydraulic structure constructions such as channels and large sewer networks. Elaboration of technical reports for the Acueducto de Bogotá ESP S.A.

January 2002- December 2003 **Lecturer in Hydraulic Laboratories**, *Escuela Colombiana de Ingeniería "Julio Garavito"*, Bogotá, Colombia.
Lectures on pipe flow and open channel flow hydraulics laboratories. Lectures to 5 groups of 7 students each, including the elaboration of laboratory guidelines and revision of reports.

Awards and Achievements

May 2013 - current **Fellowship**, *Global Institute for Water Security*, Saskatoon, Canada, Postdoctoral Researcher in Water Resources Sciences.

September 2008 - March 2012 **Scholarship**, *University College London*, London, UK, Scholarship of the Department of Geography. US $30.000 per academic year.

June 2005 - June 2006 **Representative**, *Universidad Nacional de Colombia*, Bogotá, Colombia.
Elected graduate student representative in the faculty of engineering.

Peer-reviewed journal papers

1. 2019 Carr M, Sadeghian A, Rinke K, Lindenschmidt K-E and **Morales-Marín L** (accepted), Impacts of varying dam outflow elevations on water temperature, dissolved oxygen and nutrient distributions in a large prairie reservoir. *Environmental Engineering Science*.

2. **Morales-Marín L**, Rokaya, P., Sanyal, P.R. and Lindenschmidt, K.E., (2019), Changes in streamflow and water temperature affect fish habitat in the Athabasca River basin in the context of climate change. *Ecological Modelling*, 407, p.108718.

3. Rokaya P, **Morales-Marín L**, Bonsal, B, Wheater H and Lindenschmidt K-E, (2019), Climatic effects on ice phenology and ice-jam flooding of the Athabasca River in western Canada. *Hydrological Sciences Journal*, 64:11, 1265-1278.

4. **Morales-Marín L**, Sanyal, P.R., Kadowaki, H., Li, Z., Rokaya, P. and Lindenschmidt, K.E., (2019), A hydrological and water temperature modelling framework to simulate the timing of river freeze-up and ice-cover breakup in large-scale catchments. *Environmental Modelling & Software Journal*, 114, pp.49-63.

5. Hassanzadeh E , Strickert G, **Morales-Marín L**, Noble B, Baulch H, Shupena-Soulodre E and Lindenschmidt K-E, (2018) A framework for engaging stakeholders in water quality modeling and management: Application to the Qu'Appelle River Basin, Canada. *Journal of Environmental Management*, 231, 1117-1126

2018 6. **Morales-Marín L**, Wheater H and Lindenschmidt K-E, (2018) Potential changes of annual-averaged nutrient export in a large catchment under climate and land-use change scenarios. *Water*, 10(10), 1438.

7. **Morales-Marín L**, Wheater H and Lindenschmidt K-E (2018), Estimating sediment loadings in the South Saskatchewan River catchment. *Water Resources Management* 32: 769.

2017 8. **Morales-Marín L**, Wheater H and Lindenschmidt K-E (2017) Assessment of nutrient loadings of a large multipurpose prairie reservoir. *Journal of Hydrology* 550, 166-185.

9. **Morales-Marín L**, French J, Burningham H and Battarbee R W (2017), 3D hydrodynamic and sediment transport modelling to test the sediment focusing hypothesis in upland lakes. *Limnology and Oceanography*.

10. **Morales-Marín L**, French J and Burningham H and (2017), Application of a 3D ocean model to understand upland lake hydrodynamics and circulation. *Environmental Fluid Mechanics* 17: 1255.

2016 11. **Morales-Marín L**, K P Chun, Wheater H and Lindenschmidt K-E (2016), Trend analysis of nutrient loadings in a large prairie catchment. *Hydrological Sciences Journal*, 1-23.

2015 12. **Morales-Marín L**, Wheater H and Lindenschmidt K-E (2015), Assessing the transport of total phosphorus from a prairie river basin using SPARROW. *Hydrological Processes*, 29, 4144–4160.

In revision

Lindenschmidt K-E, Carr M, Sadeghian A and **Morales-Marín L** (In revision), CE-QUAL-W2 model of dam outflow elevation impact on temperature, dissolved oxygen and nutrients in a reservoir. *Scientific Data*.

Rokaya P, **Morales-Marín L** and Lindenschmidt K-E (In revision), A physically-based modelling framework for operational forecasting of river ice breakup. *Advances in Water Resources*.

Morales-Marín L, French J, Burningham H, Evans C and Burden A (In revision), Simulating seasonal to multi-decadal variation in lake thermal response to meteorological forcing using the UCLAKE 1-dimensional model code. *Limnologica*.

In preparation

Morales-Marín L, Lindenschmidt K-E, Carr M and Sadeghian A (In preparation, September 2019), Climate change will shift thermal stratification and dissolved oxygen concentration in a large multi-purpose reservoir. *Science of the Total Environment*.

Morales-Marín L, French J, Burningham H and Evans C (In preparation, September 2019), A Graphical User Interface (GUI) development for the 3D finite volume community hydrodynamic model (FVCOM). *Computers & Geosciences*.

Morales-Marín L, French J and Burningham H, (In preparation, October 2019), Analysis of wind-wave and flow current stresses on sediment resuspension in upland lakes. *Journal of Coastal Engineering*.

Presentations

Conference proceedings

2019
1. Rokaya, P., **Morales-Marín L** and Lindenschmidt, K.E., 2019, May. Towards Improved Real-time Forecasting of River Ice Breakup. *Proceedings of the 20th Workshop on the Hydraulics of Ice Covered Rivers* At: Ottawa, Canada

2018
2. Lindenschmidt, K.E., Akomeah, E., Baulch, H., Boyer, L., Davies, J.M., Hassanzadeh, E., **Marin, L.M.**, Strickert, G. and Wauchope, M., 2018, September. Interfacing Stakeholder Involvement into a Surface Water-Quality Modelling System for Water Management and Policy Development. *In International Conference on Urban Drainage Modelling* (pp. 312-316). Springer, Cham.

Conference presentations and seminars

1. P.F. Arboleda-Obando, E. Rodriguez, D. Princz, B. Davison, A. Ireson and **L.A. Morales**, 2019 *Using the MESH model to study climate and land use changes over a subcontinental tropical river basin in Colombia-South America* Canadian Geophysical Union (CGU), Joint Assembly 2019. Montreal, July 8 - 18, Canada.

2. **Morales-Marín L**, Sanyal P, Kadowaki H, Li Z, Rokaya P and Lindenschmidt K-E, 2018 *A hydrological and water temperature modelling framework to simulate the timing of river freeze-up and ice-cover breakup in large-scale catchments.* American Geophysical Union, Fall Meeting 2018. Washington D.C. Dec., US.

3. Li Z, Lindenschmidt K, Budhathoki S **Morales-Marín L** and Williams B, 2018 *Dynamic Contributing Drainage Area Mapping in the Prairie Pothole Region: Applying a Bayesian Deep Learning Technique to Multi-temporal Radarsat-2 Images.* American Geophysical Union, Fall Meeting 2018. Washington D.C. Dec., US.

4. Budhathoki S, **Morales-Marín L** and Lindenschmidt K, 2018 *Sediment Yield and Transport Model for Cold Region Catchments.* American Geophysical Union, Fall Meeting 2018. Washington D.C. Dec., US.

5. Strickert G, Hassanzadeh E, Noble B, Baulch H, **Morales-Marín L** and Lindenschmidt K, 2017 *Putting people into water quality modelling.* American Geophysical Union, Fall Meeting 2017. New Orleans Dec., US.

6. **Morales-Marín L**, Wheater H, Lindenschmidt K and Yassin F 2017 *A new solute transport model for large scale cold region catchments: A theoretical framework.* Canadian Geophysical Union (CGU), Joint Assembly 2017. Vancouver May. 28 - 31, Canada.

7. Rokaya P, **Morales-Marín L**, Wheater H and Lindenschmidt K-E, 2017 *Hydroclimatic Variability and implications for ice-jam flooding in the Athabasca River Basin in western Canada* Canadian Geophysical Union (CGU), Joint Assembly 2017. Vancouver May. 28 - 31, Canada.

8. **Morales-Marín L**, Wheater H and Lindenschmidt K, 2016 *Impacts of climate and land use changes on regional nutrient export in the South Saskatchewan River catchment.* American Geophysical Union, Fall Meeting 2016. San Francisco Dec., US.

9. Javid H, Davison B, Princz D, Rokaya P, Sapriza-Azuri G, Wheater H, **Morales-Marín L** and Lindenschmidt K 2015 *Assessing the Impacts of Reservoir Regulations and Climate Variability on the Peace River Runoff and Peace-Athabasca-Delta Using a Distributed Hydrological Model.* American Geophysical Union (AGU), Fall Meeting 2015. San Francisco Dec., US.

10. **Morales-Marín L**, Wheater H and Lindenschmidt K, 2015 *Regional nutrient export modeling of the South Saskatchewan River catchment using SPARROW.* Canadian Geophysical Union (CGU), Joint Assembly 2015. Montreal May. 3 - 7, Canada.

11. **Morales-Marín L**, Wheater H and Lindenschmidt K, 2014 *Regional total phosphorus export modeling of the Red Deer River catchment using SPARROW.* Canadian Geophysical Union (CGU), General Meeting 2014. Banff May. 4 - 7, Canada.

12. **Morales-Marín L**, French J and Burningham H, 2012 *Hydrodynamic modelling of small upland lakes under strong wind forcing.* European Geophysical Union(EGU), General Assembly 2012. Vienna Apr. 22 - 27, Austria.

13. **Morales-Marín L**, French J, Burningham H, Evans C and Battarbee R, 2011 *Upland lake hydrodynamics and its interaction with meteorological forcings.* UCL Graduate School Research Poster Competition. London April, UK.

14. **Morales-Marín L**, French J, Burningham H, Evans C and Battarbee R, 2010 *Wind forcing of upland lake hydrodynamics: implementation and validation of a 3D numerical model.* American Geophysical Union, Fall Meeting 2010. San Francisco Dec., US.

Scholarly thesis

PhD thesis

Title *Numerical modelling of hydrodynamics and sedimentation in upland lakes: a test of sediment focusing hypothesis.*

Supervisors Prof. Jon French and Dr. Helene Burningham

Description Study of the dynamics of upland lakes using computational models to understand the effects of climate forcing on hydrodynamics and sedimentation processes. Extensive field work was undertaken with the aim of collecting information to calibrate and validate the computational models.

Master thesis

Title *Implementation and evaluation of a mathematical model to simulate the routing of a hydrograph in the Dique Channel at the Magdalena River.*

Supervisors Dr. Luis Alejandro Camacho

Description Development of a computational model using finite difference methods to resolve the 2D Navier-Stokes equations. The model was calibrated and validated against hydrographs recorded at hydrometric station along the Magdalena River (Colombia) nearby the Dique Channel.

Specialization thesis

Title *Numerical methods to solve the Saint-Venant equations in super-critical regime. A comparison against experimental data.*

Supervisors Dr. German Ricardo Santos

Description Development of algorithms using finite difference methods to resolve the Saint-Venant equations in super-critical regime. The algorithms were calibrated against discharge and water level measurements taken in a prismatic flume equipped with automatic sensors.

Grants

2016 **A water quality modeling system of the Qu'Appelle River catchment for longterm water management policy development**, *Global Institute for Water Security*, Saskatoon, Canada, Support in the preparation of the project proposal. CAN $ 309.578.

2011 **Field Work**, *University College London*, London, UK, Support for field work carried out in the north of Wales, UK .US $ 1.000.

2010 **Conferences**, *University College London*, London, UK, Maximum amount to attend to the 2010 American Geophysical Union Fall Meeting .US $ 1.800.

2006 **Research project**, *Universidad Nacional de Colombia*, Bogota, Colombia.
Grant to support master's research projects. US $ 5.000

Professional and public services activities

Professional association membership

2010 - Current **AGU**, *American Geophysical Union*, United States.

Peer reviewer for journals

2017-continued **Journal of Geophysical Research:Bioscience**.

2017-continued **Journal of Water and Land Development**.

2017-continued **Science of the Total Environment**.

2016-continued **Water**.

2016-continued **Water Resources Management**.

2015-continued **Journal of Hydrology**.

2012-continued **Limnology and Oceanography**.

Organization of scientific meeting sessions

American Geophysical Union (AGU) **AGU Fall meeting 2016**, *New Frontiers in Water Resources: Achieving Water Resource Security in Times of Climate Change, Urbanization, and Agricultural Expansion*, Convener.

Mentoring and advising activities

Graduate student co-supervision

Hammad Havid, Global Institute for Water Security, University of Saskatchewan, *Degree sought: PhD*, Start year: 2014.

Eric Akomeah, Global Institute for Water Security, University of Saskatchewan, *Degree sought: PhD*, Start year: 2016.

Graduate board exam committee membership

Alvaro Enrique Ortiz Dávila, Computing Engineering Department, Universidad Distrital "Francisco José Caldas", *Awarded degree: Ph.D. in Engineering*, In progress.

Jaime Alberto Parra Plazas, Electrical and Electronics Engineering Department, Universidad Distrital "Francisco José Caldas", *Awarded degree: Ph.D. in Engineering*, In progress.

David Andrés Zamora Ávila, Civil and Agriculture Engineering Department, National University of Colombia, *Awarded degree: Ph.D. in Civil Engineering*, In progress.

Lina Sofia Amaya Toro, Civil and Agriculture Engineering Department, National University of Colombia, *Awarded degree: M.Sc. in Water Resources Engineering*, 2016.

Languages

Spanish	**Good**	*Reading, writing, listening, speaking*
English	**Good**	*Reading, writing, listening, speaking*
French	**Basic**	*Reading, writing, listening, speaking*

Computer Skills

Programming language	Fortran77/90, C/C++	Scripting language	Shell, Python
Operative Systems	UNIX/LINUX, Windows	Numerical Software	Matlab, R
Specialized software	ArcGIS, HEC-RAS, WASP, CE-QUAL-W2, POM/FVCOM, SMS, VIC, SWAT, SWAN	Word processor	LaTeX, Microsoft Office

Laboratory and Field Work Skills

Hydraulic laboratory	Use of prismatic flumes, pipe systems and pumping systems.	Field work	Use of ADCP Acoustic Doppler Current Profiler), pressure and temperature sensors, and meteorological stations and acoustic echoe-sounder for bathymetry surveys.

Global Institute for Water Security, National Hydrology Research Centre, 11 Innovation Boulevard Saskatoon SK – S7N 3H5
☎ 1 306 966 7243 • FAX 1 306 966 1193 • ✉ luis.marin@usask.ca, lmoralesma@gmail.com

Sedimentology laboratory	Use of sizer laser to know grain distribution in sediment samples.

Interests

Professional	Computational hydrology and hydraulics	Software	Linux and high performance computing
Health	Bicycling, Swimming	Languages	English, French

References

Prof. Howard Wheater, Canada Excellence Research Chair in Water Security, *Global Institute for Water Security, University of Saskatchewan*, email: howard.wheater@usask.ca, Tel: 1 480 966 4837, Saskatoon, Canada.

Dr. Karl-Erich Lindenschmidt, Associate Professor, *School of Environment and Sustainability and Global Institute for Water Security*, email: karl-erich.lindenschmidt@usask.ca, Tel: (306) 966-6174, Saskatoon, Canada.

Prof. Jon French, Professor in Physical Geography, *Department of Geography, University College London (UCL)*, email: j.french@ucl.ac.uk, Tel: +44 (0) 20 7679 0500, London, United Kingdom.