# Nicolás Velásquez Girón

**Birth Date:** May 28 of 1986
**Phone Numbers:** +1 319 512 4194
**e-mail:** nicolas-giron@uiowa.edu, nicolas.velasquezgiron@gmail.com
**ORCID:** https://orcid.org/0000-0001-8207-5492
**GitHub:** https://github.com/nicolas998
**Web Page:** https://nicolas998.github.io

## Education

2004 - 2009 ***Civil Engineer***, *National University of Colombia*, Medellin (Colombia).

2010 - 2011 ***M.Sc. Water Resources Systems Engineering***, *National University of Colombia*, Medellin (Colombia).

2013 - 2018 ***Ph.D. Water Resources Systems Engineering***, *National University of Colombia*, Medellin (Colombia).

## Working Experience

2023 - Present **Adjunct Professor**, *The University of Iowa, College of Engineering.*

2020 - Present **Assistant researcher**, *IIHR - The University of Iowa.*

2018 -2020 **Postdoctoral researcher**, *IIHR - The University of Iowa.*

2012 - 2018 **Hydrological risks group leader and researcher**, *SIATA - EAFIT University.*

2012 - 2018 **Hydrology consultant**, *Independent.*

2011 - 2012 **Risk Management Professional**, *Area Metropolitana del Valle de Aburra.*

2009 - 2011 **Research Assistant**, *Universidad Nacional de Colombia. Facultad de Minas, Medellin.*

## Teaching Experience

2021 **Lecturer in Computational Hydrology**, *University of Manitoba, Canada.*

2019 **Teacher assistant in Hydrogeology**, *University of Iowa, USA.*

2018 **Lecturer in Hydrology**, *EAFIT University, Colombia.*

2014 - 2017 **Lecturer in Hydrology**, *Universidad de Medellin.*

2012 - 2015 **Lecturer in coding and programming**, *Universidad Nacional de Colombia, Facultad de Minas, Medellin.*

2012 **Lecturer in Hydrology**, *Politecnico Colombiano Jaime Isaza Cadavid, Medellin.*

2011 **Lecturer in Computer Science**, *EAFIT University, Colombia.*

## Current Students Mentoring

**Simon Martinez**, *M.S. Student (co-advised with Dr. Krajewski), University of Iowa*, How the Representation Scale of the Processes Affects our Hydrological Understanding?, expected to graduate in 2025.

**Jose Lozano**, *M.S. Student (co-advised with Dr. Salazar), Universidad de Antioquia*, Efecto de los cambios en los usos/coberturas del suelo y el cambio climático en el régimen de inundaciones en la cuenca del río Aburrá-Medellín, expected to graduate in 2025.

**Valeria Garcia**, *Ph.D. Student (co-advised with Dr. Weber), University of Iowa*, Development of a Nutrient Transport Model, expected to graduate in 2027.

## Former Students

**Valeria Garcia**, *M.S. (co-advised with Dr. Krajewski), University of Iowa*, Development of a Streamflow Temperature Model for HLM, graduated in 2024.

**Laura Martinez**, *M.S. (co-advised with Dr. Carvajal) Universidad Nacional de Colombia*, Analisis de las condiciondes de precipitacion detonantes de eventos torrenciales en cuencas del departamento de Antioquia, graduated in 2024.

**Sandra Patricia Salamanca**, *M.S. (co-advised with Dr. Velez) Universidad Nacional de Colombia*, Efectos de escala espacial y temporal en la modelación hidro-sedimentológica distribuida de una cuenca tropical. Caso de estudio San Lorenzo, graduated in 2020.

**Santiago Osorio**, *M.S. (co-advised with Dr. Velez) Universidad Nacional de Colombia*, Simulación de sedimentos mediante un modelo hidrológico distribuido utilizando información indirecta. Caso de estudio: Cuenca del Río Grande, Antioquia, graduated in 2019.

## Grants

2024 **Evaluating the Benefits of Conservation Practices Towards the Improvements of Streamflow Water Quality**, *Iowa Nutrient Research Center, PI*, Submitted.

2023 **Development of a real-time flood forecasting system for railroad crossings in the Midwest**, *Mid-American Transportation Center, and USDOT, Co-PI.*

2023 **Examination of the Value of QPF for Streamflow Forecasting**, *CIROH, Co-PI.*

2022 **Real-time flood forecasting for river crossings**, *Mid-American Transportation Center, Co-PI.*

## Skills:

Research, planning, leadership, critical thinking, collaboration, scientific writing, statistical and numerical analysis, oral communication.

## Publications

2024 **Effect of Streamflow Measurement Error on Flood Frequency Estimation**, *Stochastic Environmental Research and Risk Assessment, **N. Velasquez**., W. Krajewski.*

2024 **Technical Note: Testing the Connection Between Hillslope Scale Runoff Fluctuations and Streamflow Hydrographs at the Outlet of Large River Basins**, *Hydrology and Earth System Sciences, 28 (6). R. Mantilla., M. Fonley., **N. Velasquez**.*

2023 **Ensemble Kalman Inversion for upstream parameter estimation and indirect streamflow correction: A simulation study**, *Advances in Water Resources, 181, 104545 A. Pensoneault., W. Krajewski., **N. Velasquez**., X, Zhu., R. Mantilla.*

2023 **Snow-Detonated Floods: Assessment of the U.S. Midwest March 2019 Event**, *Journal of Hydrology Regional Studies, 47, 101387* ***N. Velasquez****., F. Quintero., S.R. Koya., T. Roy., R. Mantilla.*

2023 **Applicability of a flood forecasting system for Nebraska watersheds**, *Environmental Modelling and Software, 105693 S.R. Koya.,* ***N. Velasquez****., M. Rojas., R. Mantilla., K. Harvey., D. Ceynar., F. Quintero., W. Krajewski., T. Roy.*

2023 **Comprehensive Analysis of Hydrological Processes in a Programmable Environment: The Watershed Modeling Framework**, *Hydrology, 105693* ***N. Velasquez****., J.I. Velez., O.D. Alvarez., S.P. Salamanca.*

2022 **Assessment of Deep Convective Systems in the Colombian Andean Region**, *Hydrology,* ***N. Velasquez****.*

2022 **Implementation of TETIS Hydrologic Model into the Hillslope Link Model Framework**, *Water, Quintero, F.,* ***N. Velasquez****.*

2022 **The Hydrological Hillslope-Link Model for Space-Time Prediction of Streamflow: Insights and Applications at the Iowa Flood Center**, *In Extreme Weather Forecasting; Astitha, M., Nikolopoulos, E.I., Eds.; Elsevier, 2022 ISBN 9780128201244. Mantilla, R., Krajewski, W.F.,* ***Velasquez, N****., Smallll, S.J., Ayalew, T.B., Quintero, F., Jadidoleslam, N., Fonley, M.*

2022 **Sequential surface and subsurface flow modeling in a tropical aquifer under different rainfall scenarios**, *Environmental Modeling and Software, 149., 3. Jimenez, M.;* ***Velasquez, N****., Jimenez, J.E., Barco, J., Blessent, D., Lopez-Sanchez, J., Castrillon, S.C., Valenzuela, C., Therrien, R., Boico, V.F.*

2022 **Identification and Regionalization of Streamflow Routing Parameters Using Machine Learning for the HLM Hydrological Model in Iowa**, *J. Adv. Model. Earth Syst, 14.,* ***Velasquez, N****., Mantilla, R., Krajewski, W., Quintero, F., Zanchetta, A.D.L .*

2022 **Improvements in Performance of the Hillslope Link Model in Iowa using a Non-linear Representation of Natural and Artificially Drained Subsurface Flows**, *Hydrology, 8,* ***N. Velasquez****.,Mantilla, R., Krajewski, W.F., Fonley, M., Quintero, F.*

2021 **Development and Evaluation of an ODE Representation of 3D Subsurface Tile Drainage Flow Using the HLM Flood Forecasting System**, *Water Resources Research, M.R. Fonley., K. Qiu.,* ***N. Velasquez****., N.K. Haut., R. Mantilla.*

2020 **Limits of Predictability of a Global Self-Similar Routing Model in a Local Self-Similar Environment**, *Atmosphere, 11 (8),* ***N. Velasquez****., R. Mantilla.*

2019 **Meteorological conditions leading to the 2015 Salgar flash flood: lessons for vulnerable regions in tropical complex terrain**, *Natural Hazards and Earth System Sciences, 24 (3), C. D. Hoyos, L.I. Ceballos, J. Pérez-Carrasquilla, J. Sepúlveda, S.M. López-Zapata, M.D. Zuluaga,* ***N. Velásquez****, L.H. Mejía, O. Hernández, G. Guzmán, M.Zapata.*

2019 **Reconstructing the 2015 Salgar flash flood using radar retrievals and a conceptual modeling framework in an ungauged basin**, *Hydrology and Earth System Sciences, 24 (3),* ***N. Velasquez****., Velez J.I., Hoyos C.D., Zapata E.*

2013 **Multi-criteria Spatial Evaluation for the Localization of Hydro-Pico Energy in Antioquia**, *Soto E., Posada M.I.,* ***N. Velasquez****., Ramirez L.M., Garcia L., CIDET., EPM.*

2011 **Simulation of Sediment Production Using a Non-Lineal Distributed Hydrological Model**, *Universidad Nacional de Colombia, Master Thesis,* ***N. Velasquez****.*

2011 **Rainfall Distribution Based on a Delaunay Triangulation Method**, *Lecture Notes in Computer Science, Vol 6970,* ***N. Velasquez****., Valez J.I., Botero V.*

## Submitted Publications

- **Assessing the Impact of Rada-Rainfall Uncertainty in Streamflow Prediction**, *Journal of Hydrometeorology,* ***N. Velasquez****., W. Krajewski., B.C. Seo.*
- **Ensemble Kalman Inversion for Upstream Parameter Estimation and Indirect Streamflow Correction: A Case Study in the Cedar River Basin**, *Advances in Water Resources, A. Pensoneault., W. Krajewski.,* ***N. Velasquez****., W. Krajewski., X, Zhu..*
- **What Can We Learn about Flood Frequency Estimation at Ungauged Locations from High-resolution Physically-based Hydrologic Simulations?**, *Water Resources Research, R. Mantilla., G. Perez.,* ***N. Velasquez****., H. Guo., D. Wright .*

## Conference Proceedings

2023 **Assessing the Impact of Radar-Rainfall Uncertainty in Streamflow Prediction**, *AGU 2023, Oral presentation,* ***N. Velasquez****., W. Krajewski.*

2023 **Long-Term Assessment and Uncertainty Characterization of Radar-Derived Reanalysis Precipitation Estimates over Iowa**, *AMS 2023, Oral presentation, B.C, Seo., W. Krajewski.,* ***N. Velasquez****.*

2022 **A web interface to perform comprehensive hydrological model performance assessment**, *AGU 2022, Poster,* ***N. Velasquez****., W. Krajewski., R. Goska.*

2021 **How the Social Sciences and Humanities contribute to understanding and addressing the Climate Change challenges? A deep look based on the analysis of the abstracts of the presentations at the interdisciplinary sessions at AGU Fall Meetings (2010-2018)**, *AGU 2021, Poster, S. Ramirez.,* ***N. Velasquez****., H. Mercado.*

2021 **A cloud-based pre-processor for physically-based hydrologic models**, *AGU 2021, Poster,* ***N. Velasquez****.A. Arenas., L. Webster., S. Landsteiner.*

2021 **A performance index based on hydrograph moments: A descriptor to identify strengths and shortcomings hydrological simulations**, *AGU 2021, Poster,* ***N. Velasquez****., R. Mantilla., G. Perez., G, Yu.*

2020 **Insights from Physics-based Hydrologic Models and Stochastic Storm Transposition into the Underlying Assumptions of Flood Quantile Regionalization Techniques**, *EGU 2020, Oral Presentation, R. Mantilla., G. Perez.,* ***N. Velasquez****., G, Yu.*

2019 **ODE representation of tile drainage on hillslopes of varying topography**, *AGU 2019, Poster,* ***N. Velasquez****., M. Fonley., K, Qiu., N. Haut., R. Mantilla.*

2018 **Watershed Modelling Framework: A Programmable Tool for Hydrologic Simulation and Analysis**, *AGU 2018, Poster, J.I. Velez.,* ***N. Velasquez****., Hoyos, C.D., Lopera, V.A., Trujillo, J.C.*

2018 **Assessing the Spatial Structure of Stand-alone and Embedded Convective Systems in the Colombian Andean Region**, *AGU 2018, Poster,* ***N. Velasquez****., C.D. Hoyos.*

2018 **Assessing the Scale effects on a Hydro-Sedimentological model: The case of a tropical basin**, *AGU 2018, Poster, P.S. Salamanca., V.A. Lopera.,* ***N. Velasquez****., C.D. Hoyos, J.I. Velez.*

2018 **Assessment of climate change in terrestrial water storage over the Magdalena-Cauca basin**, *AGU 2018, Poster, L.A. Gomez., C.D. Hoyos.,* ***N. Velasquez****.*

2018 **An Operational Implementation Of The EPA-SWMM Model With Radar QPE Fields And Precipitation Nowcast For Urban Hazards Assessment**, *AGU 2018, Poster, E. Zapata., **N. Velasquez**., C.D. Hoyos., J. Sepulveda.*

2018 **El papel de los sistemas convectivos en la produccion de sedimentos en una cuenca tropical de montana**, *XXVIII Congreso latinoamericano de hidraulica, Presentacion oral, Salamanda, S.P., **Velasquez, N**., Lopera, V.A., Velez, J.I.*

2017 **Evaluation of rainfall structure on hydrograph simulation: Comparison of radar and interpolated methods, a study case in a tropical catchment**, *AGU 2017, Poster, Ochoa, A., **Velasquez, N**., Castillo, S., Hoyos, C.D.*

2017 **Reconstructing the 2015 Flash Flood event of Salgar Colombia, The Case of a Poor Gauged Basin**, *AGU 2017, Poster, Zapata, E., **Velasquez, N**., Hoyos, C.D., Velez, J.I.*

2017 **Explaining the behavior of runoff and subsuperficial flow: The role of the precedent water and precipitation features on a tropical basin**, *AGU 2017, Oral presentation, **N. Velasquez**., Castillo, S., Hoyos, C.D., Barco, J.*

2015 **Role of Precedent Watershed Soil Moisture on the Characteristics of the Hydrological Response and its Implications on Model Performance**, *AGU 2015, Virtual Poster Show Case, **Velasquez, N**., Velez, J.I., Hoyos, C.D.*

2014 **Simulation of Sediment Production Using a Non-Lineal Distributed Hydrological Model**, *XXVI Congreso Latinoamericano de Hidraulica, **N. Velasquez**., Velez, J.I.*

2014 **Proposal of a Computational Framework for the Hydrological Simulation**, *XXVI Congreso Latinoamericano de Hidraulica, **N. Velasquez**., Velez, J.I.*

2013 **Evaluation of the Impact in the Integration of Radar Images and Meteorological Forecasts in Hydrological Simulations**, *Encuentro Internacional en Modelacion Hidrologica y Aplicaciones, Hoyos C.D., **N. Velasquez**., Ceballos I.L., Hernandez O.*

2010 **Simulation of the River-Aquifer Interaction**, *XXIV Congreso Latinoamericano de Hidraulica, Restrepo C., **N. Velasquez**.*