David Joseph Serrano Suárez

Ph.D. Student — Water Resources Engineering

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PROFILE

Ph.D. student at the iHydro M&D Lab, Texas Tech University, working on integrated surface water–groundwater modeling with SWAT-MODFLOW. Civil engineer and hydrogeologist with 10+ years of prior experience in hydrological modeling, watershed management, and municipal water systems across Canada, the Netherlands, and Colombia. Research focuses on land-use change impacts on watershed dynamics, decision-support tools for water management, and a model-agnostic framework for diagnosing user–model interaction failures in complex scientific models.

Research goal: Advance integrated watershed modeling and decision-support frameworks that bridge technical modelers, end-users, and management stakeholders.

RESEARCH INTERESTS

- Integrated surface water–groundwater modeling (SWAT-MODFLOW)
- Land use change and watershed management
- Decision-support tools and dashboards for water management
- Diagnosing user–model interaction failures in complex scientific models

EDUCATION

Ph.D. in Civil Engineering (Water Resources) Summer 2026 – Present

Texas Tech University, Lubbock, TX, USA · Advisor: Dr. Seonggyu Park, iHydro M&D Lab

M.A.Sc. in Civil Engineering (Water Resources) 2021 – 2025

University of Victoria, BC, Canada · Advisor: Dr. Tom Gleeson

M.Sc. in Water Science and Engineering (Hydroinformatics) 2016 – 2018

IHE Delft / UNESCO-IHE, Netherlands · NFP Fellowship, Netherlands Government

B.Sc. in Civil Engineering 2008 – 2012

Universidad Pontificia Bolivariana, Colombia · Juan Pablo II Academic Excellence Scholarship

RESEARCH & PROFESSIONAL EXPERIENCE

Graduate Research Assistant — iHydro M&D Lab Summer 2026 – Present

Texas Tech University, Lubbock, TX

- Conducting Ph.D. research on integrated SWAT-MODFLOW modeling for watershed management and land-use change scenarios.
- Developing a model-agnostic framework for diagnosing user–model interaction failures in complex hydrological modeling communities (SWAT, SWAT+, SWAT-MODFLOW).

Graduate Researcher — Xwulqw'selu Watershed Project 2021 – 2025

University of Victoria, BC, Canada

- Developed and calibrated a coupled SWAT-MODFLOW model of the Xwulqw'selu watershed (Vancouver Island) to assess low-flow dynamics under logging and forest age scenarios.

- Collaborated with Cowichan Tribes, provincial agencies, and community stakeholders in a co-governance research framework.
- Integrated surface-groundwater interaction outputs into decision-support tools for long-term watershed planning.

Teaching Assistant — Civil Engineering 2021 – 2023

University of Victoria, BC, Canada

- Supported instruction in fluid mechanics and hydrology labs; assisted students with engineering design tools and calculations.

Lecturer — Civil and Environmental Engineering 2013 – 2021

Universidad Pontificia Bolivariana, Colombia

- Delivered courses in hydraulics, water distribution, and environmental systems.
- Supervised undergraduate capstone projects on municipal infrastructure and watershed restoration.

Research Intern 2017 – 2018

Deltares, Delft, Netherlands

- Developed and validated urban flood models using Delft3D FM and SOBEK.
- Contributed to testing of new drainage system modules under extreme rainfall scenarios.

Research Intern 2017 – 2018

University of California, Davis, USA

- Simulated complex groundwater systems using fractal-multifractal modeling approaches.

PUBLICATIONS

Peer-Reviewed

- Gleeson, T., Martindale, E., Shepherd, J., Serrano, D., & Kulchyski, Q. U. T. (2024). Situating place-based, community-engaged watershed research at Xwulqw'selu Sta'lo'.
- Huggins, X., Gleeson, T., Serrano, D., et al. (2023). Overlooked risks and opportunities in groundwatersheds of the world's protected areas. Nature Sustainability.
- Serrano, D., et al. (2018). Modeling 1D2D cloudburst urban floods using Delft3D FM. European Geosciences Union.

In Preparation

- Serrano, D., Gleeson, T., Park, S., et al. *(in prep).* Water and Land Use Scenarios for Sustainable Planning: Insights from a Coupled Groundwater–Surface Water Model of the Xwulqw'selu Watershed. *Target journal: Journal of Hydrology.*
- Serrano, D. *(in prep).* Foundational Framework for Diagnosing User–Model Interaction Failures in Complex Scientific Models.

TECHNICAL & PROFESSIONAL SKILLS

- **Hydrological & Hydraulic Modeling:** SWAT, SWAT-MODFLOW, MODFLOW, Delft3D FM, SOBEK, InfoWater Pro, Mike Urban
- **Civil & Water Systems Engineering:** Urban drainage, water distribution, sanitary and stormwater systems
- **Programming & Tools:** Python, MATLAB, GIS, AutoCAD Civil 3D
- **Professional:** Project management, technical writing, public communication, Indigenous and community collaboration, field & lab coordination
- **Languages:** Spanish (native), English (fluent)

AWARDS & RECOGNITION

- Top Water Student — Tsinghua University, China (2017)
- Spirit of Research & Academic Excellence Award (2012)
- Outstanding Leader Award — Social Projects (2012)
- NFP Fellowship — Netherlands Government (2016–2018)
- Juan Pablo II Academic Excellence Scholarship (2008–2012)

REFERENCES

Dr. Seonggyu Park

Assistant Professor, Texas Tech University · seonggyu.park@ttu.edu

Dr. Tom Gleeson

Professor, University of Victoria · tgleeson@uvic.ca

Herman Kernkamp, M.Sc.

Lead Developer, Deltares · herman.kernkamp@deltares.nl