Sergio A Valbuena, Ph.D.

Civil Engineer

savalbuena10@gmail.com savalbuena https://savalbuena.github.io

Profile

Postdoctoral Researcher at the University of California, Davis with 6 years of experience in fluid dynamics and numerical modeling of physical processes in water bodies. Currently developing a numerical model for mercury cycle in a mine-contaminated site as the principal investigator. Knowledgeable in physical processes in lakes, Computational Fluid Dynamics (CFD), data analysis from field observations and data, and instrument management. Adept at implementing innovative practices for engineering problem solving and optimization. Entrepreneur with fast learning and adaptability skills in search of continuous professional growth in a teamwork environment.

Employment History

2023 – · · · **Postdoctoral Researcher,** Tahoe Environmental Research Center, UC Davis. Functions: Principal Investigator for the development of a numerical model focused on addressing the mercury cycle in a mine-contaminated lake. Co-leader of field sampling for investigating the hydrodynamics of a shallow lake. Manager of real-time monitoring Nearshore Network database, and the Lake Conditions forecasting website at Lake Tahoe.

2018 – 2023 **Graduate Student Researcher.** Tahoe Environmental Research Center, UC Davis. Numerical modeler of Lake Tahoe forecasting 3D model, Lake Tahoe hydrodynamics and water quality 3D model, Lake Massawippi 3D model for invasive species tracking, and upwelling dynamics in lakes. Principal researcher on defining the boat-induced sediment resuspension in shallow waters for lake management remediation strategies. Data management and analysis of Nearshore Network time series records.

2016 – 2017 **Hydraulic Engineer.** M.Sc. Alejandro Duran Engineering, Bogotá, Colombia. Functions: perform and report hydrologic and hydraulic studies of over 100 small lakes and wetlands. Highway hydraulic design and HEC-RAS modeling for riverine systems.

2016 – 2016 **Project Engineer.** Innovatech Strategic Solutions S.A.S., Bogotá, Colombia. Functions: professional support in the construction, plan monitoring strategy, budget structuring, and preparation of reports for progress and traceability of projects.

Skills

Modeling Advance knowledge in Computational Fluid dynamics with expertise in OpenFOAM, Si3D, HEC-RAS, and Flow-2D.

Coding Advanced knowledge in Python, Matlab, Fortran, and LaTeX.

Data Advanced knowledge on time series data analysis, data collection and management, and expertise in MySQL.

GIS Advanced knowledge and expertise using QGIS and ARCGIS.

Languages Strong reading, writing, and speaking competencies for English and Spanish. Basic knowledge in Italian.

Leadership Expertise in leading field campaigns to investigate water quality and physical processes in lakes.

Research Academic research, teaching, training, consultation, typesetting, and publishing.

Misc. Knowledge in project management and Microsoft project, and AutoCAD.

Education

2023 – · · · Business Development Program Fellow at the Graduate School of Management UC Davis

2017 – 2022 **Ph.D. University of California Davis** in Civil and Environmental Engineering.
Thesis title: *Hydrodynamic modeling of the Coriolis force effects on lake physical processes and water quality dynamics.*

2017 – 2020 **M.Sc. University of California Davis** in Water Resources.
Project title: *Boat induced sediment resuspension and water clarity in shallow flows*.

2011 – 2016 **B.S. Colombian School of Engineering, Julio Garavito** in Civil engineering.

Research Publications

Journal Articles

1. S. A. **Valbuena**, F. A. Bombardelli, J. L. Largier, and G. Schladow, "Deep Water Re-oxygenation from Lake Upwelling (Submitted to Limnology & Oceanography)," pp. 1–30, 2023.
2. S. A. **Valbuena**, F. A. Bombardelli, J. L. Largier, and S. G. Schladow, "Determining the Threshold for Rotational Effects in Lake Upwelling (In preparation for Journal of Geophysical Research)," pp. 1–27, 2023.
3. S. A. **Valbuena**, F. A. Bombardelli, A. Cortés, *et al.*, "3D Flow Structures During Upwelling Events in Lakes of Moderate Size," *Water Resour. Res.*, vol. 58, no. 3, pp. 1–35, Mar. 2022, ISSN: 0043-1397. DOI: 10.1029/2021WR030666.

Conference Proceedings

1. F. Zabaleta, F. A. Bombardelli, and S. A. **Valbuena**, "Preliminary Evaluation and Design of a New Energy Dissipation Stilling Basin via Numerical and Experimental Modeling," in *9th International Symposium on Hydraulic Structures*, 2022. URL: https://digitalcommons.usu.edu/ishs/2022/all2022/13/.
2. S. A. **Valbuena**, F. A. Bombardelli, and S. G. Schladow, "Boat induced sediment resuspension and water clarity in shallow flows," in *River Flow 2020 10th Conf. Fluv. Hydraul.*, W. Uijttewaal, M. J. Franca, D. Valero, *et al.*, Eds., Delft: CRC Press, Aug. 2020, pp. 1333–1341, ISBN: 9781000294361. DOI: 10.1201/b22619.

Technical Reports

1. S. A. **Valbuena** and S. G. Schladow, "Water Clarity and Boat Induced Waves in the Nearshore of Lake Tahoe," University of California Davis, Tech. Rep., 2023.
2. F. A. Bombardelli, F. Zabaleta, K. Carr, and S. A. **Valbuena**, "Lake Perris Outlet Tower Modifications Project. Report on results of the Numerical and Physical Models," University of California, Davis, Davis, CA, Tech. Rep., 2022.
3. A. Cortés, S. G. Schladow, L. Tanaka, *et al.*, "Lake Tahoe Clarity Analysis and Modeling Phase I : Biogeochemical and Ecological Modeling," University of California Davis, Tech. Rep., 2022.
4. S. A. **Valbuena**, S. G. Schladow, and F. A. Bombardelli, "Boat Induced Sediment Resuspension and Water Clarity at Lake Tahoe," University of California Davis, Tech. Rep., 2019, pp. 1–10.

Miscellaneous Experience

Awards and Achievements

2023 **Graduate School of Management University of California Davis**, Fellowship awarded to participate in the Business Development Program.

2022 **David and Dana Loury Foundation**, Fellowship awarded in recognition of outstanding academic record.

Goldman and Schladow Limnology Fellowship, Fellowship awarded in recognition of outstanding research in Californian Lakes and particularly on Lake Tahoe.

2021 **California Lake Management Society**, Merit Scholarship awarded.

2016 **Summa Cum Laude**, University Colombian School of Engineering Julio Garavito.

Certification

2023 **UC Entrepreneurship Academy**. Awarded by University of California, Davis.