Carlos Erazo

(786) 674-8068 • cerazoramirez@uiowa.edu

Education

PhD. Student in Civil and Environmental Engineering — **Aug 2021-Present**
IIHR—Hydroscience & Engineering, University of Iowa

M.Sc. Hydroinformatics and Water Management (Erasmus Mundus +) — **Sep 2018-Sep 2020**
Awarded by the European Commission through the EuroAquae consortium, 5 universities in 5 countries of the European Union.
Main awarding institution:
Polytech Nice Sophia - Université Côte d'Azur, France

B.Sc in Civil Engineering — **Sep 2009-Mar 2015**
Universidad Tecnológica Centroamericana UNITEC, Honduras

Research interests

Development of web based hydroinformatic tools for research and education. Particular interest on data analytics, machine learning, computational optimization, and state of the art mathematical approaches for hydrological modelling.
Page: https://erazocar.github.io

Academic Experience

Graduate Research Assistant — **Aug 2021-Present**
IIHR—Hydroscience & Engineer, University of Iowa | Iowa City, United States

- Scaling of the HydroLang library adding innovative methods for performance improvement, adding stronger input from the community.
- Research collaboration in different projects including hydrologic model coupling, web-based and tools for water quality monitoring.
- Research interests: machine learning in hydrology and hydraulic modeling, hydrological models, data retrieval methods, mapping, and GIS applications, web-based tools.

Research Intern — **Mar 2020-Sep 2020**
IIHR—Hydroscience & Engineer, University of Iowa | Iowa City, United States

- Efficiently derived and implemented an open-source web-based tool for environmental and hydrological analyses (HydroLang).
- Software architecture design and implementation of state-of-the-art technologies.
- Research interests: machine learning in hydrology and hydraulic modeling, hydrological models, data retrieval methods, mapping, and GIS applications, web-based tools.

Research Intern — **Jul 2019-Aug 2019**
KU Leuven | Leuven, Belgium

- Data mining on crowd-sourced, radar, and rainfall station data within a 2D-1D dual hydrodynamic urban drainage system concept in the metropolitan areas of Antwerp and Brussels.
- Research interests: Rainfall data retrieval coming from different sources, stochastic methods implementation for radar data downscaling, 2D-1D conceptualized approaches.

Teaching Experience

Teaching Assistant — **Nov 2020-July 2021**
Brandenburg Technical University BTU | Cottbus, Germany

- Prepared lectures for master-level courses, as well as creation and grading of assignments.
- Taught 2D-3D hydrodynamic modeling with a special focus on sediment transport, contaminant propagation, and flooding in urban areas using open source software (telemac-mascaret ensemble).
- Content creation for educational conferences and workshops (HydroEurope).

Industry Experience

Consultant Engineer
Honduran Fund of Social Investments (FHIS) | Tegucigalpa, Honduras **Aug 2017-Aug 2018**

- Successful completion with the design and feasibility studies of 5 infrastructure projects throughout Honduras territory which included schools, drainage systems and road development, while maintain strict budgets under $81,000 per project.

Junior Engineer - Resident Engineer
Saybe y Asociados, S. de R.L. | Tegucigalpa, Honduras **Jan 2015-Aug 2018**

- Participated in the design and construction of 8 major public infrastructure projects, including bridges and overpasses, sewage and sanitation systems, building facilities, and road development.
- Management of a team of 15 employees for daily work tasks to guarantee quality control on projects. Cost estimation management for consultancy and contractor services.
- Consistently wrote daily, weekly, and monthly reports highlighting project development, closure, and budget allocation.

Computational Skills

Hydrology, Hydraulics, Spatial: HEC-RAS, HEC-HMS, ArcGIS, QGIS, IBER, CityCat, Hydrus1D and 2D, InfoWorks ICM, Mike11 and 21, TUFLOW, Flood Modeller, telemac-mascaret ensemble

Languages and Frameworks: C/C++, AssemblyScript, JavaScript/TypeScript, Python, R, jQuery, HTML5, Java, PHP, NodeJS, React.

Creative Software Works

HydroLang

- Development of a web-based framework for collaborative environmental and hydrological analyses using state-of-the-art frameworks for data retrieval, hydrological and hydraulic modelling, visual rendering, and map generation. Developed using JavaScript, HTML5, tensorflow.js and other libraries.

HL-ML

- Scalable version of HydroLang using web components for creation of markup language that allows ease of use for scientists and academics. Developed using JavaScript and HTML5.

WQH

- Web application developed in React serving as a one stop solution for retrieving and manipulating data coming from 5 water quality sensors deployed in Honduran territory. Developed using React and PHP.

BMI.js

- Collaborative project for the implementation and development of the Basic Modelling Interface for the JavaScript language, directly used as a secondary usage level for the HydroLang library. Develoepd in JavaScript.

Hydro-Compute

- Multi purposes modular library to perform computationally intense environmental workloads on the web. Developed using WebAssembly, WebRTC, JavaScript and WebGPU. (in development).

Honors and Awards

Awarded, 2021 CUAHSI Hydroinformatics Innovation Fellowship (project: HydroLang) **Feb 2022**

Awarded, several travel grants by Erasmus Mundus+, CGER UIowa, IFC UIowa **2018-Present**

Awarded, graduate assistantship in civil and environmental engineering department, IIHR—Hydroscience and Engineering, University of Iowa **Aug 2021**

Mention Trés Bien (Summa Cum Laude), Masters in Hydroinformatics and Water Management **Sep 2020**

Awarded, full scholarship (studies and living expenses) for master studies in Hydroinformatics and Water Management, awarded by the European Union on the Erasmus+ scheme **Sep 2018**

Awarded, best overall grades in several civil engineering courses, UNITEC **Aug 2014**

Research Grants

Erazo, C. (PI), 'HydroLang: An Open-Source Web-Based Programming Framework for Hydrological Sciences'. Source: Hydroinformatics Innovation Fellowship, CUAHSI, 2022-2023. Amount: $5k

Academic Publications

Ewing, G., **Erazo, C.,** Vaidya, A, Demir, I., *'Coupling client-side web applications via the BMI Specification for Hydrological Modeling'*, 2022 EarthArvix http://dx.doi.org/10.31223/X5XP93 (in review Journal of Hydroinformatics)

Erazo, C., Sermet, Yusuf, Demir, *'HydroLang Markup Language: Community-Driven Web Components for Hydrological Analyses*, 2022 EarthArxiv https://doi.org/10.31223/X5NP9M (in review Journal of Hydroinformatics)

Erazo, C., Sermet, Yusuf, Demir, I., Molkenthin, F., *'HydroLang: An Open-Source Web-based Programing Framework for Hydrological Sciences'*, Environmental Software and Modelling, 2022. https://doi.org/10.1016/j.envsoft.2022.105525

Professional Activities

Vice Chair, University of Iowa's Hackathon, 2022
Mentor, University of Iowa International Program, 2021-Present
Member, Honduras College of Civil Engineers, 2015- Present
Member, Erasmus Mundus Alumni Association, 2018-Present

Presentations

Erazo, C., Sermet, Y., Demir, I., Molkenthin, F., *'HydroLang: An Open-Source Web-based Programing Framework for Hydrological Sciences'* (presentation) CUAHSI Making Waves Seminar, Nov 2022.

Erazo, C., Sermet, Y., Demir, I., Molkenthin, F., *'HydroLang: An Open-Source Web-based Programing Framework for Hydrological Sciences'* (poster) AGU Fall 2022, Dec 2022 (to be presented).

Erazo, C., Sermet, Y., Demir, I., Molkenthin, F., *'HydroLang Markup Language: Community-Driven Web Components for Hydrological Analyses'* (poster) IAHR Young Professional Congress, Nov 2022 (to be presented).

Sidibe, T., **Erazo, C**., Chidambaram, S., Albertini, J., Poggio, J., Brum, M., Wang, M., Watt, S., Barragan, Z. *'Presentations HydroEurope Weeks 1 and 2, river geometry and mesh types*', (oral) WaterEurope Project conferences, February 2020, Nice, France.