





Mario Ponce-Pacheco

Hydrology – Data Science – Software development

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EXPERIENCE

Technische Universiteit Delft

April 2024 -> present (temporal position until September 2024)

Project Manager / Teaching Assistant

I'm collaborating in the organization of the biggest course of the faculty: Modelling, Uncertainty and Data for Engineers (MUDE); which is taken by more than 200 students and around 30 lecturers and Teaching Assistant are involved. Additionally, I'm playing the role of Scrum Master of a group of computer sciences students who are developing tools for grading the course's assignment.

Supervisor: Robert Lanzafame (r.c.lanzafame@tudelft.nl)

Technologies: Python, Django

Jan 2023 – March 2024

Researcher / Backend developer

I executed the backend development for an app implementing a socio-hydrological model in Maharashtra, India. Developed a robust API for seamless frontend communication and automated climatic data processing. Mentored Master's students in algorithm implementation and presented research findings at conferences and in publications.

Supervisor: Saket Pande (s.pande@tudelft.nl)

Technologies: Python, Django REST, Linux

BairesDev

Jun 2021 – Aug 2022

Python Engineer

Responsible for implementing Machine Learning algorithms in order to improve the performance of a cooking robot. Responsible for elaborating and running tests, and then reporting results. Also, I used to fix bugs in the performance of the robot, by examining logs and elaborate experiments to be implemented by the support team. I have worked under agile technologies such as Scrum and Canvas.

Technologies: Python, C++, ROS, pytest, Linux

Tata Consultancy Services

Sep 2020 - Jun 2021

Software Engineer

Responsible for giving support in Linux systems to financial projects, as the account of Morgan Stanley and American Century Investment. I got also training in AWS technologies.

Technologies: Python, AWS, Linux

Soluciones en Ingeniería y Tecnologías del Agua

Nov 2018 – Aug 2020

Hydrology and Hydroinformatics Consultant

Oversaw hydrological modelling, flood simulations, and devised mitigation solutions for the Cerro de la Estrella Protected Natural Area. Successfully designed solar-powered water pumping systems to meet the needs of rural communities. Spearheaded the implementation of an automated irrigation system for a greenhouse and green roof, enabling remote control and monitoring through an Internet of Things platform.

Technologies: Python, IoT, R, Raspberry, Arduino, QGIS, HEC-RAS, Linux.

Deltares

May 2018 – Sep 2018

Intern

Managed the processing of raster files and spatial time series, with a focus on down/up-scaling; which now it's part of a commercial toolbox. Conducted runoff simulations for European basins, considering diverse climate change scenarios using Wflow. Played an integral role in organizing the Global Flood Partnership 2018 event in Delft. Innovatively extended a model-builder tool to enable the creation of hydrological models with open calibration and global climate data. Collaboration in establishing a global hydrological model at a one-kilometre resolution, utilizing the KMNI-RACMO database.

Supervisor: **Abrecht Weerts** (albrecht.weerts@deltares.nl)

Technologies: Python, Wflow, Linux

Irrigation engineer

Aug 2011 – Apr 2016

Throughout these years, I contributed my skills to various small companies, taking on versatile roles depending on the project:

- Designed and implemented sprinkler and drip irrigation systems for papaya and lemon crops, significantly improving agricultural outcomes for rural communities.
- Spearheaded the development and management of geographic information systems while also conducting hydrological model simulations.
- Conducted comprehensive assessments of a municipality's sanitation infrastructure and drinking water supply, resulting in improved local infrastructure planning.
- Designed efficient irrigation systems and soil conservation infrastructure to enhance agricultural practices and environmental sustainability

Technologies: GIS, R, python

University of Arizona

Jan 2010 – Mar 2010

Intern

I worked for the university's controlled environment agriculture centre. Measured and managed experimental data. Maintained a greenhouse. Designed a mechanism with a team to automatically calculate drainage in greenhouses.

Supervisor: **Murat Kacira** (mkacira@cals.arizona.edu)

Technologies used: CRBasic

Independent Project

Jul 2015 – Sep 2015

Web Designer

Designed web pages. Maintained and designed websites for the irrigation department of the Autonomous University of Chapingo and their graduate program in agricultural engineering and integral use of water.

Technologies used: HTML5, CSS3, WordPress, Joomla

EDUCATION

Wageningen University & Research

Master's Degree in Climate Studies, 2016-2018

Hydrology and Quantitative Water Management Group

Minor: Dynamic Systems Modelling

Thesis: Feasibility of the application of the Lattice Boltzmann Method to resolve flow in a sharp river bend

Supervisor: **Ton Hoitink** (ton.hoitink@wur.nl), **Paul Torfs**

Description: I studied the feasibility of the implementation of the Lattice Boltzmann Method - novel CFD method - in the simulation of natural flows, identifying their advantages and disadvantages; as well as the limitations of implementation in large-scale problems. Special focus on the similarity between the physical and computational models, and their relationship in the stability, accuracy, and efficiency of the simulations.

Universidad Nacional Autónoma de México, UNAM

Postgraduate Degree in Applied Statistics, 2014- 2015

Universidad Autónoma Chapingo, UACH

Bachelor's Degree in Irrigation Engineering, 2006-2010

Thesis: Design of irrigation networks using Differential Evolution algorithms and Artificial Bee Colony

Supervisor: Irinieo López Cruz (ilopez@correo.chapingo.mx)

Description: I studied the algorithms of Differential Evolution and Artificial Bee Colony, for which I proved their efficiency in different types of problems in continuous and discrete domains. Later I propose a cost function for the design of a hydraulic distribution network. Finally, I analysed the algorithms' performance in minimising the cost of the proposed objective function.

INCOMPLETE EDUCATION

Universidad Autónoma de la Ciudad de México, UACM

Master in complexity sciences, 2019→
Part-time student in parallel with my job.
(unfinished)

Metropolitan Autonomous University, UAM

Applied Mathematics specialist 2015-2016
Truncated to 30%. I left it behind to go to the WUR

RELEVANT COURSES

OPENSENSE Training School

COST Actions, 2023 in Tel Aviv

Coursera – DeepLearning.AI

Deep Learning Specialization, 2022

Universidad Nacional Autónoma de México, UNAM

Diploma in aerobic treatment and wastewater reuse, 2021

Instituto Politécnico Nacional

Machine Learning, 2021

Karlsruhe Institute of Technology

Spring School in Lattice Boltzmann Methods with OpenLB Software Lab, 2018

LANGUAGES

	Spoken fluency	Reading Fluency	Written fluency	Level
Spanish	—	—	—	Native
English	High	High	High	B2
French	Low	Confident	Low	A2

SKILLS

OS

- Windows
- UNIX: Debian, CentOS, MacOS

Text edition

- Latex

Statistics and Data Science

- Machine Learning
- Bayesian Statistics

Optimization

- Differential Evolution
- Bioinspired Algorithms

Programming languages

- Python — Advanced
- R — Advanced
- MATLAB — Intermediate
- C++ — Intermediate
- C — Intermediate

Open Hardware

- Raspberry pi — Advanced
- Arduino — Intermediate
- IoT — Basic

CFD

- OpenFoam
- Lattice Boltzmann Method

WEB

- Django REST
- HTML5/CSS3

Databases & datasets

- mySQL, SQLite, PostgreSQL
- RASTER & SHP
- NetCDF
- CML, PWS, SML

Complexity

- Non-linear dynamic
- Cellular automata
- Agent-based model

Agile methodologies

- SCRUM

Cloud Services

- AWS — Intermediate