# Francisco Zambrano PhD


- Providencia, Santiago, Chile
- Chilean-Italian


## Skills

**Programming (Python/R/Matlab)** 10+ yrs.

**ML/DL (Python/R)** 5+ yrs.

**MySQL / PostgreSQL** 5+ yrs.

**CI/CD** 5 yrs.

**Google Earth Engine** 3 yrs,

**Amazon Web Service (AWS|EC2)** 3 yrs.

**Dockers** 3 yrs.

**Reproducibility (Rmarkdown/Quarto)** 6 yrs.

**Prototyping (R-Shiny/Python-Streamlit)** 5 yrs.

## Python libraries

- NumPy, Pandas, Matplotlib
- GeoPandas, rasterio, xarray, rioxarray, fiona
- scikit-learn, PyTorch
- streamlit

## R packages

- tidyverse
- terra,sf,tmap
- tidymodels
- shiny

## Summary


Senior Geospatial Data Scientist with 15+ years in remote sensing and spatial analysis for climate change, agriculture, and water resources. Led research projects (ANID-funded) totaling >600M CLP, developing national platforms (ODES-Chile, SatOri) for drought monitoring and irrigation optimization. Expertise in R, Python, GIS, and ML/DL to drive data-driven decisions in AgTech and climate risk. Seeking industry roles to apply academic insights to scalable solutions.


## Experience

**Senior Geospatial Scientist & Project Lead** — **Feb 2018 - Aug 2025**
Earth Observation Center
Hemera - Universidad Mayor

- Built and launched ODES-Chile (https://odes-chile.org) - national drought observatory & early-warning system processing ERA5-Land, MODIS, CHIRPS at country scale (1,000-10,000 monthly users including Ministry of Agriculture).
- Designed and deployed SatOri (https://s4tori.cl) - operational satellite irrigation optimization platform for cherry orchards using Sentinel-2 + meteorological data + ML to predict stem water potential and deliver irrigation recommendations.
- Developed and released national PM2.5 forecasting dashboard (2025) combining SINCA stations + satellite aerosol data + ML (https://frzambra.shinyapps.io/app_pm25).
- Secured and directed 600M CLP ( US$650k) in competitive grants as Principal Investigator.
- Published lead-author papers in Remote Sensing of Environment, Agricultural Water Management, Earth's Future

**Visiting Doctoral Researcher** — **Sep - Dec 2016**
Faculty of Geo-Information Science and Earth Observation (ITC)
University of Twente, Enschede, The Netherlands

- Built agricultural productivity decline models using MODIS/CHIRPS time-series and spatial analytics; published in Remote Sensing of Environment (impact: policy-relevant for Chilean drought mitigation).

**Visiting Doctoral Researcher** — **Jan-Jun 2016**
CALMIT/NDMC
University of Nebraska, United States

- Evaluated satellite precipitation products for drought monitoring; results in Atmospheric Research, informing national agroclimate reports.

## Selected Publications


1. **Zambrano, F.**, Anton, V., Meza, F., Duran-llacer, I., Fernández, F., Venegas-González, A., Raab, N., Craven, D., 2025. From Drought to Aridification: Land-cover fingerprints of a drying Chile. Earth's Future. https://doi.org/10.1029/2025EF006744

2. **Zambrano, F.**, Herrera, A., Olguín, M., Miranda, M., Garrido, J., & Almeida, A. M. (2025). Prediction of the daily spatial variation of stem water potential in cherry orchards using weather and Sentinel-2 data. *Agricultural Water Management, 318*, 109721. https://doi.org/10.1016/j.agwat.2025.109721

## Spatial data

- MODIS
- ERA5/ERA5-Land
- CHIRPS
- Sentinel-1/2
- Landsat 7/8/9
- SoilGrid
- CMIP6

## Languages

- English - Advanced (B2-C1)
- Spanish - Native

## Education

**03/2014 - 09/2017**

**Ph.D in Agricultural Engineering, Mention in Water Resources**
Universidad de Concepción

**03/2000 - 09/2007**

**Civil Engineering**

Universidad de Concepción

## Contact

+56 9684 77864

frzambra@gmail.com

francisco-zambrano.cl

Google Scholar

0000-0001-6896-8534

Researchgate

LinkedIn

Github

3. **Zambrano, F.**, Vrieling, A., Nelson, A., Meroni, M., Tadesse, T., 2018. Prediction of drought-induced reduction of agricultural productivity in Chile from MODIS, rainfall estimates, and climate oscillation indices. Remote Sensing of Environment 219, 15–30. https://doi.org/10.1016/j.rse.2018.10.006

4. **Zambrano, F.**, Wardlow, B., Tadesse, T., Lillo-Saavedra, M., Lagos, O., 2017. Evaluating satellite-derived long-term historical precipitation datasets for drought monitoring in Chile. Atmospheric Research 186, 26–42. https://doi.org/10.1016/j.atmosres.2016.11.006