Jesús M. Rueda-Becerril — Ph.D.

✉ jm.ruebe@gmail.com • 🌐 altjerue.github.io • in jeruebe • ⚙ altjerue

ⓘ 0000-0003-1988-1912 • ⓧ jm.ruebe

Profile

Astrophysicist with industry and HPC experience, strong mathematical foundations, and expertise in Python, geospatial analysis, and machine learning. Skilled in designing scalable analytical tools, optimizing scientific code, and translating complex data into actionable insights.

Experience

Spatial Data Scientist — May 2025 — Present
TealWaters
- Lead project to optimize code for topographic terrain modeling and elevation derivative calculation.
- Engineered Python tools for geospatial data processing and analysis, utilizing QGIS for visualization and analysis.
- Utilize Wetland Intrinsic Potential (WIP) tool with random forest for wetland probability mapping in Skykomish watershed.
- Performed EDA, feature engineering, and geospatial data preparation—including multispectral (Sentinel 1/2) processing—for ML/AI land-cover and wetland probability models.
- Share knowledge and results with managers and decision-makers, train team members on WIP tool usage, and collaborate with software engineers and scientific team to transition prototypes into production.

Independent Research/Open-Source Developer — Jan 2024 — May 2025
- Developed scientific codes (Tleco, WindsOfChange), completed ML/AI coursework, and contributed to open-source geospatial and scientific-computing tools.

Software Engineer — Apr 2022 — Jan 2024
Paychex
- Conduct data preparation, validation, and analysis in SQL from Oracle EBS datasets.
- Built Java Kafka consumers for efficient data transfer across databases; deploy using Jenkins and OpenShift.
- Collaborate with stakeholders and engineers to meet product needs and code standards.
- Create Splunk dashboards and alerts for production data analysis.

Postdoctoral Research Scientist — Jan 2018 — Apr 2022
UMSNH (Mexico), Purdue University, Rochester Institute of Technology
- Lead NSF-sponsored project to upgrade scientific code for HPC simulations of black hole binaries; benchmark and optimize performance.
- Collaborate on large-scale HPC simulations of neutron star mergers; produce 2 high-impact papers.
- Obtain $68,000 NASA grant as primary researcher; manage 3 Ph.D. researchers; published 3 papers, 2 proceedings, and 5 presentations.
- Designed large-scale computational experiments and analytical workflows for astrophysical data and simulation outputs.
- Designed Python script for machine learning (SVM) training framework.
- Conduct workshop on HDF5 dataset creation and manipulation for graduate students.

Graduate Research Assistant — Oct 2009 — Jul 2017
UMSNH (Mexico), Universitat de València (Spain)
- Automated Shell and Python tools for data processing and curation in HDF5 format; ensure data quality and integrity.
- Implement numerical tools for calculating spectra from particle distribution functions.
- Use Python and R for exploratory data analysis on NASA telescope datasets; yield 2 papers and present at international meetings.
- Enhanced scientific code using Runge-Kutta solver for light behavior near black holes; yield high-impact paper.

Skills

Proficient: Python, QGIS, R, C/C++, Unix/Linux, Shell, git, HPC, LaTeX, Fortran 95, HDF5

Familiar: SQL, Julia, Docker, Azure

Tools: Slurm, MongoDB, Rust, Splunk, Jenkins, OpenShift

Education

Ph.D. in Physics   **Oct. 2011 – Jul. 2017**
Universitat de València, Valencia, Spain   Excellent *Cum Laude*

M.Sc. in Physics   **Aug. 2009 – Sep. 2011**
Universidad Michoacana de San Nicolás de Hidalgo, Morelia, Mexico

B.Sc. in Physics   **Aug. 2004 – Dec. 2008**
Universidad Autónoma del Estado de México, Toluca, Mexico   *"Dr. Juan Josafat Pichardo" Award*

Projects

WindsOfChange   **Aug 2024 — May 2025**
Open Source Code for Spore Dispersion in Hilly Terrains   *[GitHub]*
○ Simulate spore dispersion in hilly terrains using R and C++.

Tleco   **Jan 2024 — Sep 2024**
Open Source Code for Relativistic Particle Radiation Simulation *[GitHub]*
○ Simulates relativistic plasma particles and radiation rise from accelerating particles.
○ Combines Rust and Python functions from the Fortran code `Paramo`.

Paramo   **Oct 2018 — Apr 2022**
Open Source Code for Radiative Transfer in Relativistic Astrophysics *[GitHub]*
○ Built an HPC-optimized radiative-transfer simulation code (OpenMP; 60× speedup).
○ Applied ML techniques (gradient descent) for parameter optimization and implemented Python tools for analysis.
○ Used in 5 scientific publications.

Co-Founder, Mexican Scientists Abroad   **Aug 2019 — Feb 2021**
Group of Mexican Scientists bridging science and public knowledge *[Homepage]*
○ Collaborated on Python scripts for [COVID-19 modeling and forecasting] in Mexico.
○ Authored [blogposts] and [infographics] to combat misinformation.