Dr. Carlos Peralta

Atmospheric and data scientist. Geospatial analyst.

Curriculum Vitae

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⌾ https://github.com/carlos9917
🖥 https://weatherlinguist.bearblog.dev

SUMMARY

Mathematical modeller and data scientist with an academic background in physics. Trained as an astrophysicist but keenly applying my skills and experience to a wide variety of data science problems. A very diverse professional and personal background has helped develop my ability to learn, adapt and solve problems in innovative ways. Extensive experience in data simulation, modelling, analysis and visualisation.

WORK EXPERIENCE

CURRENT, FROM NOV 2018 (FT)

Danish Meteorological Institute
Senior Scientist in NWP

Produced climate projections for The Arctic and Denmark. Developed GIS software for shadows of obstacles near the roads to improve road weather prediction. Developed and optimized operational verification tool for deterministic and probabilistic forecasts. Developed visualizations for weather and verification scores. Monitoring and display of model production, post-processing of climate data

JUL 2015 – OCT 2018 (FT)

Enercon
Developer for meteorological simulations

Developed software for wind energy using CFD, weather models (WRF), and data processing. Data engineering of wind and weather data. Worked on wind power forecasting. Provided customer support, developed tailored weather forecasts and data visualizations

JUL 2011 – JUN 2015 (FT)

Fraunhofer Institute for Wind Energy
Research Scientist

Developed multiple CFD solvers and turbulent-modelling libraries in OpenFOAM. Wrote meteorological software for external clients. Developed scripts for post-processing meteorological data. Participated in international project meetings and conferences, wrote reports and publications
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AUG 2009 – JUN 2011 (FT)

German Weather Service (DWD)
Research Scientist

Developed first version of initial condition perturbations for operational ensemble system. Evaluated and verified probabilistic forecasts. Participated in international project meetings and conferences, wrote reports and publications.

SEP 2007 – JUL 2009 (FT)

Max Planck Institute for Gravitational Physics
Junior Scientist

Signal analysis for gravitational waves. Simulation of sources of gravitational waves.

EDUCATION

2007 **Doctor of Philosophy**
Astrophysics group. School of Physics
University of Melbourne

2002 **Master of Science in Physics**
Department of Physics
University of Oriente

1997 **Bachelor of Science in Physics**
CUM LAUDE
Department of Physics
University of Oriente

AWARDS

2002-2007 **Melbourne Postgraduate Scholarship**
University of Melbourne

1991-1997 **Manuel Peñalver Award – Physics**
University of Oriente

COMPUTER SKILLS

PROGRAMMING	Fortran,C,C++,shell scripting Python,R,Julia
DATA VISUALIZATION	Matplotlib,QGIS, NCL, Grads Bokeh, Plotly, Streamlit, Shiny
DATA SCIENCE/ML	SQL,pandas,numpy,scipy,scikit-learn keras,tensorflow,pytorch tidyverse,dplyr
WORD PROCESSING	MS Office,Libreoffice,Latex
DEVOPS	Git, CICD, Docker, kubernetes Airflow, GCP
WEATHER MODELS	COSMO,WRF,Harmonie,ECMWF
DATA STORAGE FORMATS	NetCDF,GRIB,BUFR,zarr

COMMUNICATION SKILLS

LANGUAGES	Spanish (native)
	English/German (fluent) Swedish (proficient)
PUBLICATIONS	Author/co-author of 55 papers, reports and conference proc.
EDITORIAL ACTIVITIES	Energies editorial board Reviewer of CFD/weather journals
STUDENT SUPERVISION	Supervised 6 master students 3 interns, 1 PhD student

SKILLS

Scientific Versatility and Problem-Solving Passion

My journey from astrophysics to operational meteorology demonstrates my ability to bridge diverse scientific domains effectively. Having worked across gravitational wave physics, wind energy, and weather prediction systems, I've developed a unique perspective on complex scientific challenges. My experience handling terabyte-scale weather data and developing operational forecasting systems reflects my passion for solving real-world problems through innovative approaches. This multidisciplinary background, combined with extensive international collaboration experience, enables me to quickly adapt to new challenges and communicate effectively across technical and cultural boundaries.

Data science an data engineering

As an experienced data scientist and researcher, I actively embrace new technologies. I leverage AI and machine learning daily, from optimizing data pipelines to enhancing weather predictions, viewing these technologies not as optional tools but as essential components of contemporary professional practice. Just as email and internet transformed workplace communication, AI is revolutionizing how we approach complex problems and data analysis. My experience implementing machine learning solutions in operational meteorology and my continuous education in this field positions me to help organizations navigate this technological transition effectively, harnessing AI's potential while maintaining rigorous scientific standards and ethical considerations.

COURSES

Writing and Research (2023). Scientific Writing and Communication Course with Mathew Stiller-Reeve.

Machine Learning Zoomcamp (2022). Online machine learning zoomcamp with Alex Grigorev. Practical projects with scikit learn, deep learning.

Applied Machine Learning in Python. Coursera/University of Michigan, (2018). Fundamentals of machine learning. Supervised and unsupervised machine learning. Model evaluation.

Wind Energy. Coursera/Technical University of Denmark (2015). Fundamentals of wind energy. Wind profiles, wind resource assessment. The economics of wind farms.

Managing big data with MySQL. Coursera/Duke University (2016). Fundamentals of SQL. Data aggregation, subqueries and derived tables. General MySQL fundamentals.

Machine Learning. Coursera (2015). Machine learning course with Andrew Ng.

SELECTED PUBLICATIONS

Yang, X., Amstrup, B., Peralta, C. and Hintz, K. (2022). Danish Regional Reanalysis. Scientific Report for year 2021. DMI report 22-13

Toja-Silva, F., Konno, T., Peralta, C., Lopez-Garcia, O. and Chen, Jia (2018). A review of computational fluid dynamics (CFD) simulations of the wind flow around buildings for urban wind energy exploitation. J. of Wind Eng. and Ind. Aerodyn. 180

Peralta, C., Ben-Bouallegue, Z., Theis, S. E., Gebhardt, C. and Buchhold, M. (2012). Accounting for initial condition uncertainties in COSMO-DE-EPS. J. of Geoph. Res. Atmospheres,117, D07108

For a complete list see my researchgate profile

SELECTED PRESENTATIONS

Accounting for temporal phase errors in the verification of surface parameters with the HARMONIE-AROME model. European Meteorological Society Annual Meeting. Copenhagen, Denmark (2019)

Topographic Effects on the Wakes of a Large Wind Farm. German Wind Energy Conference, DEWEK. Bremen, Germany (2015)

Accounting for analysis uncertainties in COSMO-DE-EPS. Joint SRNWP Workshop on Data Assimilation and Ensemble Prediction Systems. Bologna, Italy (2011)