Dr. Carlos Peralta

Atmospheric and data scientist. Geospatial analyst.

Curriculum Vitae

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https://github.com/carlos9917

SUMMARY

Mathematical modeller and data scientist with an academic background in physics. Professional experience in research and development of large-scale scientific software in the industry and academia. Hands on experience as data engineer, data pipelines maintenance and acquisition/processing of terabyte-sized weather data from heterogeneous sources. Current focus on operational meteorology for short term weather forecasts, climate projections, software development and data visualization.

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.

JUN 2002 – AUG 2007 (FT)

Astrophysics Group. University of Melbourne
Doctoral and Postdoctoral researcher

Proposed turbulent flow as a cause of timing irregularities in pulsars. Discovered timing irregularities in pulsars follow an avalanche process.

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 PROCESSING/ML	SQL,pandas,numpy,scipy,scikit-learn keras,tensorflow,pytorch,tidyverse,dply
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

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

Multidisciplinarity

I have considerable experience in working in an international and multidisciplinary environment. I speak three languages fluently. My record also shows that I am able to move effectively between fields. This provides me with the skills to quickly adapt to new working environments and to efficiently tackle new challenges.

Passionate

I became interested in natural sciences from an early age and my education and research cemented this interest into a passion for problem solving. I enjoy analyzing and visualizing data, understanding patterns and trends and applying computer simulations and machine learning methods to real life problems.

COURSES

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)