Curriculum Vitae for Ada Ortiz-Carbonell

Personal information

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Born:	7^{th} January	Nationality:	Spanish

Summary

I am a senior researcher with 20 years of experience in academic research in the field of Astrophysics. I hold a PhD in Physics from 2003. In 2019 I moved into the industry sector where I started using machine learning algorithms, data lakes and edge device infrastructure. I have mostly worked on predictive maintenance in Hydropower and anomaly detection projects. My expertise includes image analysis, time-series analysis, signal processing, feature recognition, analytical models and statistical analysis.
I consider myself perseverant and used to overcome adversity in a scientific environment by being creative, hard-working, and having an analytical mindset. Excellence, accuracy and detail define my scientific work.

Technical skills

Frameworks	NumPy/SciPy, Pandas, Matplotlib, Keras/TensorFlow
Languages	Python, IDL, Octave, Fortran
Scientific skills	Image analysis, signal processing, pattern recognition, anomaly detection, analysis of time series, analytical modelling, statistical analysis
Tools	Mac OS X, Unix, Linux, Jupyter Notebook, Git, AWS, LaTeX

Education

2000 - 2003	**PhD in Physics**. University of Barcelona (Spain). Thesis title: "Solar irradiance variations induced by faculae and small magnetic elements in the photosphere". *Summa Cum Laude*.
1997 - 2000	**Research Proficiency**. University of Barcelona (Spain)
1993 - 1997	**Licentiate in Physics**. University of Barcelona (Spain)

Professional experience

2004 – 2006	**Postdoctoral fellow**. High Altitude Observatory, National Center for Atmospheric Research, (Boulder, USA)
2007 – 2010	**Postdoctoral fellow**. Institute of Theoretical Astrophysics, University of Oslo, (Norway)
2013 – 2014	**Lecturer**. Institute of Theoretical Astrophysics, University of Oslo, (Norway)
2015 – 2017	**Visiting Scientist**. Instituto de Astrofísica de Andalucía (IAA-CSIC), (Spain)
2010 – 2019	**Senior researcher**. Institute of Theoretical Astrophysics, University of Oslo, (Norway)
2019 –	**Consultant**. Expert Analytics (Oslo, Norway)

Languages

Catalan	mother tongue
English	fluent
Italian	intermediate
Norwegian	intermediate
Spanish	mother tongue

Personal skills

Analitycal thinking	I have the ability to tackle the unknown by collecting the necessary data, analyzing and interpreting it, obtaining results using cross-disciplinary methods, and present them in an easy-to-understand way.
Communication and writing skills	I am regarded by my peers as an excellent speaker, both in scientific talks to an specialized audience or in educating the public. Proven experience in writing scientific documents (30 published articles). I have been nominated by my peers to become a TED speaker.
Complex problem solving	I like applying creativity to break down complex problems into smaller parts that can be tackled in an easier way, while keeping the big picture in mind. Combine methods from different disciplines to solve problems.
Leadership	Thanks to holding a few research grants involving international collaborations, I have earned experience as project leader and manager. I also feel comfortable as team member where I am organized, structured and a responsible player.
Organizational skills	I have well-proven experience as organizer for several international conferences and schools, where I have done everything from managing the logistical aspects, setting up the conference's websites and planning the scientific programmes.

Teaching and outreach	Being Lecturer provided me with the ability to explain difficult material in an understandable language for the non-expert. I have significant experience in outreach, explaining complex science to the general public. Examples of this are invitations to deliver public talks at Queen's University Belfast (UK) and the University of Oslo (Norway) aimed for a general audience. I am editor of two outreach books and have made media appearances (radio and articles in the Spanish newspaper El País)

Some interests and hobbies

Scientific outreach	Outreach officer in Norway for the European Solar Telescope project, Astronomy on Tap (astronomy for the general public), as well as regular educative outreach talks & events for the general public
Sports	Alpine skiing, scuba diving, martial arts

Extended descriptions of selected projects

Activity	Advanced Chalk Influx Advisor
Period	2020-2021
Role	Data Scientist
Staffing	team of 2
Description	This project is part of AkerBP's digitalization program, Eureka, in which the team designed an approach where we apply both physics-based models, root-cause analysis and data driven applications with the aim of understanding and predicting chalk influx events into the Valhall oilfield. I was actively involved in designing an analysis pipeline for field data obtained through the Cognite Data Fusion platform, in particular developing signal processing analysis, pattern recognition and anomaly detection models. To date I have been involved in the deployment of two models in the Petroleum Experts' platform.
Tools	Python, Scipy, Cognite Data Fusion, Github, Jupyter Notebook

Activity	Audio Analytics predictive maintenance in Hydropower
Period	2020
Role	Data Scientist
Staffing	team of 6

Description	This project investigates whether analysing audio profiles from heavy rotating machinery (hydropower generators) and applying deep learning algorithms can help identifying and isolating faulty units. We take a non-invasive approach that allows continuation of power production while predictive maintenance is being carried out. I contributed to the Machine Learning team developing appropiate signal processing algorithms to be run on edge devices. I was involved in defining the analytical solution as well as in the maintenance of the infrastructure which involves edge devices and a cloud services platform. This project is very novel and poses a research challenge. As such, the project is showcased as the Norwegian user-case in a H2020-ECSEL grant application in which Expert Analytics is a partner.
Tools	Python, AWS Cloud, Scipy, Github, Gitlab, Jupyter Notebook, TensorFlow, Keras

Activity	Observing and understanding flux emergence using IRIS and SST coordinated data. Research project funded by the Research Council of Norway.
Period	2016-2019
Role	Principal Investigator
Staffing	2 members and 5 collaborators
Description	This effort aimed at studying how magnetic fields living in the interior of the Sun rise up and trespass the surface of the star while continuing their journey up through the solar atmosphere. In this project, I combined large data sets (images and spectra) both from spacecrafts and ground-based observatories and pre-processed them. In addition, I was in charge of carrying out the data analysis, which required developing specific scientific coding for image analysis, spectral analysis, statistical analysis, and comparison with numerical simulations. I was responsible for several scientific articles published in peer-reviewed journals and for presentation of the results in international conferences.

Activity	Space and ground-based observations of the solar atmosphere. Research project funded by the Research Council of Norway.
Period	2011-2013
Role	Principal Investigator, Project leader
Staffing	me, with 4 collaborators
Description	The goal of this project was to study the lower part of the solar atmosphere at the highest spatial resolution. Both the dynamics and magnetism of the physical processes going on in the surface were studied. For this project I pre-processed large astronomical data sets of images and spectra (cleaning the data from instrumental effects and making them ready-to-use). I developed the programming codes in order to analyse images, time series, create feature tracking algorithms, and statistical data analysis. I was the main author in the resulting articles published in international peer-reviewed journals, and presentations in conferences.