



# Matteo De Felice

*Climate Data Scientist*

*Scientific Office, DG JRC, European Commission*

## CONTACTS

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## RESEARCH INTERESTS

Statistical modelling & Probabilistic Forecasting ■ Energy & Meteorology ■ Energy Modelling ■ Climate Services ■ Climate Data Analysis

## WORK EXPERIENCE

**2018 - present** JRC — Knowledge for the Energy Union Unit

Research activity on the modelling of the water-energy nexus and development of high-resolution data sets of hydro-power modelling.

**2011 - 2018** ENEA — Climate Modeling and Impacts Laboratory

Research activity on energy generation/demand forecasting methodologies using weather-climate information. Seasonal Forecasts verification and Climate Services. Research about data mining methods applied to a wide range of energy-related topics. Participation in EU Projects: SPECS, EUPORIAS, SINGULAR, H<sub>2</sub>020 CRESCENDO ENEA PI for Copernicus ECEM project, INTERREG projects. Responsible of service contract to TERNA S.p.A (Italian Transmission System Operator). Organising Committee of the two Climate Services Masterclasses (Bolzano, May 2015 and May 2016)

**2015 - 2018** Consultant for Amigo Climate SRL

Development of the data analysis framework based on R and Microsoft Azure technologies for the development of extreme climate indices for African Risk Capacity (ARC) Extreme Climate Facility.

**2007 - 2010** ENEA — Energy Efficiency Department

Research activity on computational intelligence methodologies for energy processes in collaboration with the *Distributed Generation Technical Unit*. Research activity about the development of optimisation systems for renewable energy management and control methods for building-energy plants in collaboration with the Department of Informatics and Automation (DIA) of the University of Rome "Roma Tre". Development of on-line optimisation and diagnostics for combined-cycle power plants. Research grant by *Italian Electric System Research Plan 2009-2011* and MIUR-630 Project (University and Research Ministry).

## EUROPEAN PROJECTS

- ✓ H<sub>2</sub>020 - MED-GOLD (Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems ), ~dec 2017-2021: **Budget:** 4.9 M€ (ENEA 470k€). **Role:** ENEA coordination team, WP leader, involved in the climate services development, added value analysis and stakeholder engagement.
- ✓ H<sub>2</sub>020 - S<sub>2</sub>S<sub>4</sub>E (Sub-Seasonal to Seasonal Climate Prediction For Energy), ~dec 2017-2020: **Budget:** 4.7 M€ (ENEA 290k€). **Role:** PI for ENEA, WP leader, involved in the analysis of the application of climate data sets for the energy sector, stakeholder engagement.
- ✓ H<sub>2</sub>020 - SECLI-FIRM (the Added Value of Seasonal Climate Forecasts for Integrated Risk

- Management Decisions ), 2018-2022: **Budget:** 4.6 M€ (ENEA 240k€). **Role:** analysis and development of multi-model seasonal forecasts systems, implementation of machine-learning algorithms for the use of climate information in the energy sector
- ✓ Copernicus Climate Change Programme - ECEM (European Climatic Energy Mixes), 2015-2018: **Budget:** ENEA 120k€. **Role:** PI for ENEA, involved in the application of seasonal climate forecasts for the energy sector, statistical modelling of demand and hydro-power generation.
  - ✓ Interreg V-A Italy-France (Maritime) STRATUS, 2018-2020: **Budget:** 1.3 M€ (ENEA 211k€). **Role:** project writing and PI for ENEA, analysis of the end-users needs and on the impact of climate variability on the competitiveness of the tourism sector.
  - ✓ H2020 - CRESCENDO (*Coordinated Research in Earth Systems and Climate: Experiments, kNowledge, Dissemination and Outreach*): **Budget:** 14.3 M€ (ENEA 259k€). **Role:** researcher involved in climate data analysis
  - ✓ FP7 - SINGULAR (Smart and Sustainable Insular Electricity Grids Under Large-Scale Renewable Integration), 2013-2016: **Budget:** 3.6 M€ (ENEA 87 k€). **Role:** Researcher involved in WP2 on the development of Renewable Energies forecasting tools
  - ✓ FP7 - EUPORIAS (European Provision Of Regional Impact Assessment on a Seasonal-to-decadal timescale) 2012-2016: **Budget:** 8.9 M€ (ENEA 371 K€). **Role:** researcher involved in tasks 12.2-12.4 on the assessment of stakeholders' needs on Climate Services and in the development in an operational Climate Services in collaboration with the World Food Program, Ethiopian Government and other European research institutions. Also in the organising committee of the two EUPORIAS Masterclass on Climate Services held in 2015 and 2016.
  - ✓ FP7 - SPECS (Seasonal-to-decadal climate Prediction for the improvement of European Climate Services), 2013-2016: **Budget:** 8.2 M€ (ENEA 401 k€). **Role:** WP Leader for the Pilot Applications (use of the climate forecast for solar and wind power production); involved in seasonal forecasts verification and on the analysis of multi-model ensembles.
  - ✓ FP7 - CLIM-RUN (Climate Local Information in the Mediterranean region Responding to User Needs), 2011-2014: Project coordinated by ENEA with the objective of contributing in the creation of a Climate Services Network in the Mediterranean area. **Budget:** 3,5 M€ (ENEA 401 k€). **Role:** researcher, involved in the creation of the Case Studies portal.

## RESEARCH VISITS

6-9/2009, 7-10/2010, 3/2012: Visiting Researcher at CERCIA (*The Centre of Excellence for Research in Computational Intelligence and Applications*), University of Birmingham, UK. Research activity on forecasting of electricity demand on different scales (building, regional, national). Supervisor: Prof. Xin Yao. The visits have been funded by: EU IntelliCIS COST Action ICo8o6, ENEA and CERCIA

## EDUCATION

2007-March 2011 University of Rome "Roma Tre" — Ph.D. European Label student at the *Department of Informatics and Automation (DIA)* in collaboration with *ENEA (Italian Environment New Technology and Energy Agency)*. Thesis title: APPLICATION OF COMPUTATIONAL INTELLIGENCE TO ENERGY SYSTEMS. Advisor: Prof. Stefano Panzieri.

2004-2007 University of Rome "Roma Tre" — Laurea magistrale (MSc) in *Informatics and Automation Engineering* in collaboration with *ENEA*. Thesis's topic: EVOLUTIONARY NEURAL NETWORKS WITH COMPLEX NETWORK TOPOLOGY FOR DYNAMICS SYSTEMS MODELING. Grade: 110/110

2001-2004 University of Rome "Roma Tre" — Laurea primo livello (BSc) in *Informatics Engineering* in collaboration with *Alenia Space*. Thesis's topic: PORTING OF SIMULATION MODELS FROM XMATH TO MATLAB. Grade: 110/110 *cum laude*

## TEACHING AND LECTURES

Teaching and seminar activities for Fuzzy Control and Control Systems courses (2011-2014) at

the Department of Informatics and Automation, University of Rome “Roma Tre”.

Lecture at 2nd CLIM-RUN School: Building Two-way Communication: A Week of Climate Services (2013). Invited talk Severo Ochoa Research Seminar Lecture Series at the Barcelona Supercomputing Centre (Sep 2015)

## OTHER ACTIVITIES

- Involvement in the creation of a Research Data Alliance Interest Group about “Weather, Climate and Air Quality”
- Reviewer for the Research Council of Norway
- Referee activities for many scientific journals (including Nature Scientific Reports, Renewable Energy (*Elsevier*), Applied Energy (*Elsevier*)). The full list of verified reviews is available on Publons at <https://publons.com/a/590063/>
- Program Committee for ICARIS2011, ICARIS2012, PPSN2012, CISDA2012, WCCI2012, ICANNGA2013, SSCI2013
- Organization of Complex Networks Seminars for the Doctoral School of Engineering at the Department of Informatics and Automation, University of Rome “Roma Tre”.
- Outside examiner for 1 Ph.D. thesis, >10 master theses at DIA, University of Rome “Roma Tre”, tutoring for two MSc students at DIA and for a student from University Politehnica of Bucharest.
- Java Programming Teacher for a course funded by Regional Authority.  
C Programming Teacher for TMS.

## COMPUTER SCIENCE SKILLS

R programming, Python, MATLAB programming for analysis and data analysis. Development of interactive and web-based applications with Shiny. Data mining and analysis. Java/C/C++ programming with the most common scientific libraries. Software tools and libraries for climate data processing (CDO, WGRIB, R loader, R ncd4, Python Iris and xarray). Database PostgreSQL, MySQL and SQLite. Microsoft Azure, IBM Bluemix and Amazon AWS cloud services.

## LANGUAGES

Italian mother tongue. Good proficiency in written and spoken English (CEFR Level C2).

## SELECTED PUBLICATIONS

I have authored 21 journal papers, 3 book chapters and 13 peer-reviewed conference papers. The full list is available at <http://www.matteodefelicename.com/research/publications/>

- 1) A. Alessandri, M. De Felice, F. Catalano, J-Y. Lee, B. Wang, Lee D.Y, J. H. Yoo, and A. Weisheimer, **Grand European and Asian-Pacific multi-model seasonal forecasts: maximization of skill and of potential economical value to end-users,** Climate Dynamics, 2017.
- 2) De Felice M., Alessandri A., and F. Catalano, **Seasonal climate forecasts for medium-term electricity demand forecasting,** *Applied Energy*, vol. 137, pp. 435-444, 2015.
- 3) A. Alessandri, M. De Felice, N. Zeng, A. Mariotti, Y. Pan, A. Cherchi, J. Lee, B. Wang, K. Ha, P. Ruti, and others, **Robust assessment of the expansion and retreat of Mediterranean climate in the 21st century,** *Nature Scientific Reports*, vol. 4, 2014.
- 4) M. De Felice and X. Yao, **Short-Term Load Forecasting with Neural Network Ensembles: A Comparative Study,** *IEEE Computational Intelligence Magazine*, vol. 6, iss. 3, pp. 47-56, 2011.
- 5) M. De Felice, I. Bertini, A. Pannicelli, and S. Pizzuti, **Soft Computing based optimisation of combined cycled power plant start-up operation with fitness approximation methods,** *Applied Soft Computing*, vol. 4, pp. 4110-4116, 2011
- 6) A. Athanasiou, M. De Felice, G. Oliveto, and P. Oliveto, **Evolutionary Algorithms For The Identification Of Structural Systems In Earthquake Engineering,** in International Conference on Evolutionary Computation Theory and Applications, 2011 [**best paper nomination**]