Lorenzo Silvestri

Curriculum Vitae

Professional objectives

Earth system modeling and **Earth observations** are the main topics that i have been studying during my PhD and they represent my main areas of interest. **Fluid dynamics** is my favourite discipline, especially when applied to the Earth system as in **meteorology**, **hydrology** or **atmospheric physics**. Turbulence modelling, mountain meteorology and surface meteorological observations are my specializations. My current professional goals are: working in these areas and all the relative applications; applying my knowledge; continuously learning about these fields.

PhD Thesis

Title	***Regional Observations and global ERA5 reanalysis as tools to assess climate in Central Italy and develop a regional meteo-climate service***
PhD Course	*Energy and Sustainable Development, University of Perugia (SSD FIS-06)*
Supervisor	Professor Paolina Bongioannini Cerlini
Description	This PhD Thesis regards the physical description of the meteo-climatic situation in Umbria region, *with emphasis on the orographic forcing*. This information is used to optimize the regional meteorological observation network and is derived by using different data sources: meteorological observation from ground stations, atmospheric reanalysis and atmospheric models.

Masters Thesis

Title	***Numerical study on wind-wave interfacial phenomena***
Master Degree	*Aerospace Engineering (LM-20), University of Bologna*
Supervisor	Professor Andrea Cimarelli
Description	This thesis regards the *computational fluid dynamics* (CFD) field: a numerical model has been developed and exploited in order to investigate the role of turbulence in the wind-waves formation process and the effect of the water free surface on the boundary layer statistics. The open source software OpenFOAM has been used in order to perform the numerical simulations.

Publications

Paolina Bongioannini Cerlini, Miriam Saraceni, and Lorenzo Silvestri. Competing effect of the radiative and the moisture feedback in convective-aggregation states in two crms. *under second round of review in Journal of Advances in Modeling Earth Systems (JAMES)*, 2022.

Paolina Bongioannini Cerlini, Miriam Saraceni, Lorenzo Silvestri, Silvia Meniconi, and Bruno Brunone. Monitoring the water mass balance variability of small shallow lakes by an era5-land reanalysis and water level measurement-based model. an

application to the trasimeno lake, italy. *Atmosphere*, 13(6):949, 2022.

Paolina Bongioannini Cerlini, Lorenzo Silvestri, Silvia Meniconi, and Bruno Brunone. Performance of three reanalyses in simulating the water table elevation in different shallow unconfined aquifers in central Italy. *under second round of review in Meteorological Applications*, 2022.

Lorenzo Silvestri, Miriam Saraceni, and Paolina Bongioannini Cerlini. Quality management system and design of an integrated mesoscale meteorological network in Central Italy. *Meteorological Applications*, 22(9), 2022.

Lorenzo Silvestri, Miriam Saraceni, and Paolina Bongioannini Cerlini. Links between precipitation, circulation weather types and orography in central Italy. *International Journal of Climatology*, 1(19), 2022.

PB Cerlini, M Saraceni, F Orlandi, L Silvestri, and M Fornaciari. Phenological response to temperature variability and orography in central Italy. *International journal of biometeorology*, pages 1–16, 2021.

Paolina Bongioannini Cerlini, Lorenzo Silvestri, Silvia Meniconi, and Bruno Brunone. Simulation of the water table elevation in shallow unconfined aquifers by means of the ERA5 soil moisture dataset. The Umbria region case study. *Earth Interactions*, pages 1–54, 2021.

Paolina B Cerlini, Lorenzo Silvestri, and Miriam Saraceni. Quality control and gap-filling methods applied to hourly temperature observations over central Italy. *Meteorological Applications*, 27(3):e1913, 2020.

Education and Research

05/2021 **Training Course: A hands-on introduction to Numerical Weather Prediction Models: Understanding and Experimenting**, *(23 hours)*, ECMWF, European Centre for Medium-Range Weather Forecast, Reading (UK).

03/2020–04/2020 **Training Course: Parametrization of subgrid physical processes**, *(40 hours)*, ECMWF, European Centre for Medium-Range Weather Forecast, Reading (UK).

08/2019–to present **Temporary Research fellow: Progetto SpatialMeteo DSS**, *University of Perugia, DICA-CIRIAF*, "Progetto Spatialmeteo DSS: Infrastrutture per la validazione meteo-climatica dei dati agro-meteo per l'utilizzo in sistemi di supporto alle decisioni".

01/2019–04/2019 **EGU General Assembly 2019**, *Coauthor of the following presentation: "Validation of a regional agrometeorological network in Central Italy using ECMWF ERA5 reanalysis"*, EGU, European Geophysical Union, Vienna, Austria.

Training Course: Advanced numerical methods for earth-system modeling, *(40 hours)*, ECMWF, European Centre for Medium-Range Weather Forecast, Reading (UK).

Phd Course: Dispersion modeling of air pollutants in the atmosphere, *(15 hours)*, University of Perugia - ARPA Umbria, Lecturer: Marco Vecchiocattivi.

Phd Course: Introduction to atmospheric Physics and Climate, *(25 hours)*, University of Perugia, Lecturer: Paolina Bongioannini Cerlini.

08/2018–07/2019 **Temporary Research fellow: Progetto Smartmeteo**, *University of Perugia, DICA-CIRIAF*, "Progetto Smartmeteo: Sviluppo di un sistema innovativo agro-meteorologico e monitoraggio fitopatologico a supporto delle imprese agricole".

11/2018 to 04/2022 **Phd Student in Energy and Sustainable Development**, *University of Perugia*, Academic Tutor: Paolina Bongioannini Cerlini.

09/2015–12/2017 **Master Degree Aerospace Engineering**, *University of Bologna, Campus of Forlì*, ***Two-year international English language course***, *Grade – 104/110*.
Study plan oriented on fluid dynamics

03/2015–07/2015 **Course of Thermofluid-dynamics and thermal plants**, *(250 hours)*, University of Perugia.

09/2011–02/2014 **Bachelor Degree in Mechanical Engineering**, *University of Perugia*.

Professional and computer skills

My passion for mathematics led me in **handling complex mathematical model** and numerical analysis issues regarding mainly fluid dynamics and meteorology.
I am a critical thinker and a **very good observer** due to my scientific studies and my love for nature. These skills make me capable of analysing, post-processing complex data to **find problems, connections and solutions**.
Excellent working knowledge of **Python, Matlab, OpenFOAM** and many tools for post-processing meteorological data (**NCL, pyNGL, MetView, CDO**) and reading their format (**NetCDF, GRIB, BUFR**). Good knowledge of the **ECMWF** products, **Copernicus** products. Good at handling atmospheric models such as **WRF** and **OpenIFS**. Basic knowledge in handling CAD software as AutoCAD, Inventor, SolidWorks and fluid dynamics simulation software as Ansys (Fluent). Good knowledge of GIS software such as **QGIS**.

Personal skills

Communication Thanks to the experiences as tutor, entertainer, member of the Formula SAE team and, above all, as scout educator for the association AGESCI, I am an **effective communicator** with good interpersonal skills as **the capability of engaging the others' interest**. This helped me in many oral presentations about my research during national and international conferences as well as many collaborations with the climate movement Fridays4Future of Perugia city.

Organization I am a member of the **scout association AGESCI** from 2012. During these years, I have been in charge of a group of 30 children. From this experience, I have gained organization skills.

Teamwork I played for Perugia and Angelana football team as a professional footballer and this experience makes me a **great team worker**.

Languages

English **Very good level (B2)** *IELTS (2015) certification avarage score 6.5*

Work experience

University

09/2015–09/2017 **Tutor dyslexic students**, UNIVERSITY OF BOLOGNA.
Guiding students on their personal study and on the relationships with professors.

09/2016–03/2017 **Formula SAE Project**, UNIVERSITY OF BOLOGNA.
Project and realization of a DRS (drag reduction system) for a Formula SAE vehicle. Throughout this experience I increased my knowledge about simulation software.

Miscellaneous

06/2011–06/2014 **Summer camp Educator**, Association A.S.A.D, Perugia.

06/2011–06/2014 **Adults and children Entertainer**, Osteria di Pinocchio, Perugia.
Role of high responsibility and always in contact with people of every ages.

Volunteering

2012 to present Service as educator for the scout groups Forlì 3 and Perugia 7

2012-2015 Entertainer in the Alzheimer Care Home in Perugia

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Perugia
04/01/2023