

Francesco Ferrari

# Curriculum vitae

**Francesco Ferrari**

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## EDUCATION

- 2022 - present: RTDA at University of Milano.
- 2018 - 2021: postdoc at University of Genova.
- 30 March 2017: PhD in Civil, Chemical and Environmental Engineering, curriculum in Fluid-dynamics and Environmental Engineering at University of Genova
  - thesis title: *Exploiting the WRF-ARW model for the prediction of flash-floods events over Liguria: a validation strategy and an investigation of the role of the sea surface temperature.*
  - supervisor: prof. Andrea Mazzino
- 18 July 2013: Master Degree in Physics at University of Genova
  - thesis title: *Study of the sensitivity of a meteorological model to parameterization schemes of clouds microphysics*
  - supervisor: prof. Andrea Mazzino
  - final mark: 103/110
- March 2010: Bachelor Degree in Physics at University of Genova
  - thesis title: *Determination of atmospheric particulate optical attenuation in the Mediterranean Sea*
  - supervisor: prof. Paolo Prati
  - final mark: 90/110
- July 2005: high school diploma at 'Nicoloso da Recco' scientific high school
  - final mark: 80/100

## TECHNICAL SKILLS AND COMPETENCES

- Excellent knowledge of Windows/Linux
- Excellent knowledge of Office packages (Word, Excel, Power Point)
- Excellent knowledge of Python and Shell programming languages
- Basic knowledge of C++ and Fortran
- Good knowledge of Latex, Mathematica, QGIS, GraDS

- Good experiences in compiling and installing WRF, WRF-Chem, Calmet weather models
- Mother tongue: Italian
- Other languages:  
English:
  - reading: good
  - writing: very good
  - understanding: good

## **SCIENTIFIC ACTIVITIES**

### **PhD and Postdoc**

- Study by means of WRF numerical model simulations of extreme events, with specific focus on floods that affected Liguria Region in past years. Investigation of the role of different features that were expected to play a fundamental role in triggering, development and localization of intense convective system, as microphysical parameterization schemes, Sea Surface Temperature, Cloud Condensation Nuclei concentration (WRF-Chem) and atmospheric boundary layer turbulence.
- Energetic application of WRF simulations. Mapping of wind and waves potentials of the whole Mediterranean basin. Identification of areas where wind and wave events are not time-correlated in order to plan coupled energy extraction from wind and waves. Production and analysis of a 40-years long wind and wave hindcast of the Mediterranean Basin.
- Evaluation of WRF high resolution simulations performances over complex terrain, finalized to the forecast optimization of wind farms output. Evaluation of the impact of observed nudging in simulation performances (in progress).

## **PARTICIPATION IN RESEARCH PROJECTS**

- Sicomar Plus - SIsistema transfrontaliero per la sicurezza in mare COntro i rischi della navigazione e per la salvaguardia dell'ambiente MARino. (Cross-border system for maritime safety against the risks of navigation and for the protection of the marine environment). Financed by Intereg - Marittimo EU
  - contribution to development of a meteo-maritime operational model chain.
- SINDBAD - Sicurezza Navigazione da Diporto (Safety recreational and sport yachting). Financed by PORFESR
  - WRF model configuration and optimization on Amazon Web Service Cloud Computing System.
- ENDAS - Enhancement of data assimilation and data driven modeling to improve the meteorological predictions at different space and time scales.

## **TEACHING EXPERIENCES**

- 2015/2016: Teaching assistant. Physics I course for the bachelor degree in Pharmacy and Chemical and Pharmaceutical Technologies at University of Genova.

- 2016/2017: Teaching assistant. Physics I course for the bachelor degree in Biology at University of Genova.
- 2019/2020: Teaching assistant. Physics I course for the bachelor degree in Electronic Engineering at University of Genova.
- 2020/2021: Teaching assistant. Physics I course for the bachelor degree in Electronic Engineering at University of Genova.
- 2020/2021: Ocean Science and Engineering course for the bachelor degree in Maritime Science and Technology at University of Genova.
- 2021/2022: Teaching assistant. Physics I course for the bachelor degree in Electronic Engineering at University of Genova.
- 2021/2022: Ocean Science and Engineering course for the bachelor degree in Maritime Science and Technology at University of Genova.

## SUMMER SCHOOLS

- CNR-ISAC Summer School: *Mediterranean Sea: Models, Observations and Experiments*, Lecce, Italy, September 2014.
- CNR-ISAC Summer School: *Advances in Severe Weather Analysis: Models and Observations*, Lecce, Italy, June 2016.
- International Summer School on Atmospheric and Oceanic Sciences, L'Aquila, Italy, August 2018.
- Short Course on WRF Modelling for Wind Energy Applications, Cagliari, Italy, June 2019.

## CONFERENCES

- F. Ferrari, G., Besio, F. Cassola, and A. Mazzino, *Stima preliminare del potenziale energetico combinato onde-vento all'interno del bacino del Mediterraneo*, COAST: "Gestione e tutela della costa e del mare - sessione speciale sullo sfruttamento delle energie rinnovabili marine", Ferrara, Italy September 2016, oral presentation.
- F. Ferrari, G., Besio, F. Cassola, and A. Mazzino, *Valutazione della sostenibilità energetica dello sfruttamento combinato onda-vento nel bacino del Mediterraneo*, Associazione Italiana di Cartografia: "Cartografia e crescita blu" conference, Genova, Italy, May 2017, oral presentation.
- F. Ferrari, G., Besio, F. Cassola, and A. Mazzino, *Wind and wave energy resource assessment and exploitability in the Mediterranean Sea*, "9th European Seminar OWEMES", Bari, Italy, October 2017, oral presentation.
- F. Ferrari, F. Cassola, A. Mazzino, M. Morichetti, G. Passerini, M. M. Miglietta, and U. Rizza *Aerosol-related applications of a coupled weather and chemical transport modelling system: the case study of Vernazza, Cinque Terre, 25 October 2011*, EMS Annual Meeting, European Conference for Applied Meteorology and Climatology Budapest, Hungary, September 2018, oral presentation.

- F. Ferrari, G., Besio, F. Cassola, and A. Mazzino, *Wind and wave energy resource assessment and exploitability in the Mediterranean Sea*, XXXVI convegno nazionale di idraulica e costruzioni idrauliche, Ancona, Italy, September 2018, oral presentation.
- F. Ferrari, M.Steyer, F. Ruffino, F. D'Alessio, *How to run and scale Weather Research and Forecasting on AWS*, webinar at HPC on AWS, Global Conference 2020, 4 November 2020.
- Hugues, Ruffino, Aquilanti, Ferrari, Venuti, Tran, Smith, Pizzaro, Soham, *Best Practices for HPC in the Cloud*, presentation of a tutorial at ISC High Performance 2022, Hamburg, 29 May 2022.

## PUBLICATIONS

- F. Cassola, F. Ferrari and A. Mazzino, *Numerical simulations of Mediterranean heavy precipitation events with the WRF model: A verification exercise using different approaches*, Atmospheric Research, 164-165: 210 - 225 (2015)
- F. Cassola, F. Ferrari, A. Mazzino and M.M. Miglietta, *The role of the sea on the flash floods events over Liguria (northwestern Italy)*, Geophysical Research Letters, 43: 3534 - 3542 (2016)
- F. Ferrari, G. Besio, F. Cassola, and A. Mazzino, *Optimized wind and wave energy resource assessment and offshore exploitability in the Mediterranean Sea*, Energy (2020)
- E. Ottaviani, N. Gjerci, A. Novellino, P. D'angelo, M. Alba, P. Brotto, F. De Leo, F. Ferrari, G. Besio, A. Mazzino, M. Figari, R. Zaccone, L. Corgnati, C. Mantovani, M. Berta, M. Magaldi, *SINDBAD: a new operational service for a safer leisure and boating navigation*, Conference Paper, IMEKO TC-19 International Workshop on Metrology for the Sea, Genova, October 2019.
- F. Ferrari, F. Cassola, Peter Enos Tuju, Alessandro Stocchino, Paolo Brotto and A. Mazzino, *Impact of Model Resolution and Initial/Boundary Conditions in Forecasting Flood-Causing Precipitations*, Atmosphere (2020).
- F. Ferrari, F. Cassola, Peter Enos Tuju, and A. Mazzino, *RANS and LES face to face for forecasting extreme precipitation events in the Liguria region (northwestern Italy)*, Atmospheric Research (2021).
- A. Lira-Loarca, F. Ferrari, A. Mazzino, G. Besio, *Future wind and wave energy resources and exploitability in the Mediterranean Sea by 2100*, Applied Energy (2021).
- L. Cavaleri, L. Bertotti, G. Besio, F. Ferrari, *The 29 October 2018 storm in Northern Italy: its multiple actions in the Ligurian Sea*, Progress in Oceanography (2022).
- G. Casciaro, F. Ferrari, D. Daniele Lagomarsino-Oneto, A. Andrea Lira-Loarca, A. Mazzino, *Increasing the skill of short-term wind speed ensemble forecasts combining forecasts and observations via a new dynamic calibration*, Energy (2022).

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