



## Alessandro De Lorenzis

[REDACTED]

✉ Email address: [ale7delo@hotmail.it](mailto:ale7delo@hotmail.it)

✉ Email address: [delorenzisalessandro@pec.it](mailto:delorenzisalessandro@pec.it)

[REDACTED]  Skype: live:ale7delo

[REDACTED] Date of birth: 25/07/1987 Nationality: Italian

### ABOUT ME

Alessandro De Lorenzis got the PhD in "Physics and Nanoscience" at University of Salento (Lecce, Italy) in 2020. His research activities were mainly focused on the reproduction of present and past Mars climate conditions by means of General Circulation Models (GCMs). He processed several meteorological data collected by all the landers/rovers that explored the Red Planet and compared them with the output generated by climatic models. He also simulated the echoes of the MARSIS radar for the orbits covered by the ESA Mars Express mission, with the aim of selecting new regions of Mars where it could be possible to detect the presence of liquid water in the subsurface of the planet. During the PhD, he signed a scientific collaboration with the Advanced Scientific Computing (ASC) Division of CMCC for the period 2017-2019 in order to run, on the HPC facilities of the Foundation, the climatic models above mentioned.

In 2021, he joined the Ocean Predictions and Applications (OPA) Division of CMCC. He is involved in the AdriaClim research project, founded by the Italy-Croatia Interreg Cooperation Programme, dedicated to the study of the impacts of climate changes in the Adriatic Sea region. The principal research activities are related with the validation of climatic models by comparing simulated atmospheric and ocean meteorological parameters with satellite and in-situ observations.

Alessandro is also involved in the OPEN-air laboRAtories for Nature based solUtions to Manage hydro-metro risks (OPERANDUM) research project.

### WORK EXPERIENCE

[ 15/03/2021 – Current ] **Post-Doc at CMCC Ocean Predictions and Applications (OPA) Division**

*Euro-Mediterranean Center for Climate Change (CMCC)*

**City:** Lecce

**Country:** Italy

**Main activities and responsibilities:**

Validation activities of climatic models by comparison between simulated meteorological atmospheric and ocean variables and satellite/in-situ observations.

Research activities within the AdriaClim project and Operandum Project.

[ 02/03/2021 – 13/03/2021 ] **Mathematics and Physics teacher at the secondary school**

*Liceo Scientifico "Cosimo De Giorgi"*

**City:** Lecce

**Country:** Italy

[ 04/02/2021 – 27/02/2021 ] **Mathematics and Physics teacher at the secondary school**

***Liceo Classico Musicale "G. Palmieri"***

**City:** Lecce

**Country:** Italy

[ 05/11/2020 – 27/02/2021 ] **Mathematics and Physics teacher at the secondary school**

***Liceo Scientifico "Cosimo De Giorgi"***

**City:** Lecce

**Country:** Italy

[ 18/02/2019 – 15/03/2019 ] **Research stay**

***Istituto Nazionale di Astrofisica (INAF) – Istituto di Radioastronomia (IRA)  
Bologna***

**City:** Bologna

**Country:** Italy

**Main activities and responsibilities:**

**Scientific Leader:** Prof. Roberto Orosei (INAF - Bologna)

**Research activities developed:**

- Application of a parallel code (*MARSIS simulator*) for the simulation of the echoes collected by the MARSIS radar
- Validation of the simulations performed through comparisons with observed radar dataset and pre-existing simulations
- Production of surface reflectivity maps to be compared with analogous maps based on observations with the aim of identifying the variations of the dielectric constant on the surface of Mars

[ 10/01/2018 – 17/04/2020 ] **Scientific Leader of Research Project**

***University of Salento - Department of Mathematics and Physics "E. De Giorgi"***

**City:** Lecce

**Country:** Italy

**Main activities and responsibilities:**

**Research project name:** *Measurement system for the assessment of meteorological parameters and of the presence of pollutants in the atmosphere by means of a tethered balloon*

**Winning announcement:** 5 per mille per la ricerca – anno 2015

**Research group involved:** Laboratory "Aerosol & Clima" research group of the University of Salento, INFN Section of Lecce, Astrophysics Laboratory of the University of Salento

**Aim of the project:** develop a monitoring system that uses a tethered aerostatic balloon to measure the main meteorological parameters (temperature, relative humidity, wind speed and direction, atmospheric pressure) and the concentration and size distribution of atmospheric particulate.

N. B. The project is still ongoing, the date here reported as ending of the activities refers only to the completion of the PhD program.

[ 15/12/2016 – 17/04/2020 ] **Scientific affiliation with Advanced Scientific Computing (ASC) Division of CMCC Foundation**

*Euro-Mediterranean Center for Climate Change (CMCC) - section of Lecce*

**City:** Lecce

**Country:** Italy

**Main activities and responsibilities:**

**Research activity developed**

- Use of the *Athena* (CMCC) cluster for the installation of the *MarsCAM-NCAR* simulation software for the planet Mars
- Analysis and processing of the output generated with GCMs by means of *Ophidia* (CMCC) tool
- Optimization of the *Ophidia* (CMCC) big-data analysis tool for managing data of astrophysical interest
- Parallel computing
- Use of the *Athena* (CMCC) cluster to port the simulation code (the *MARSIS simulator*) of the MARSIS radar echoes collected during the orbits of the Mars Express probe around the planet

[ 01/03/2016 – 15/04/2016 ] **Mathematics and Physics teacher at the secondary school**

*Istituto Tecnico "Grazia Deledda"*

**City:** Lecce

**Country:** Italy

[ 16/02/2015 – 31/07/2015 ] **Research activity contract**

*University of Salento - Department of Mathematics and Physics "Ennio De Giorgi"*

**City:** Lecce

**Country:** Italy

**Main activities and responsibilities:**

**Main activities and responsibility:** Use of simulation climatic software aimed at the paleoclimatic study of the planet Mars, in detail: "Study of the Martian paleoclimate through numerical simulations"

**Type of activities:** Research activities within the research project "Exomars", founded, within the ExoMars mission, by the European Space Agency (ESA) and the Russian Space Agency (Roscosmos)

[ 19/03/2015 – 15/04/2015 ] **Mathematics and Physics teacher at the secondary school**

*Istituto Tecnico "Grazia Deledda"*

**City:** Lecce

**Country:** Italy

[ 07/11/2016 – 17/04/2020 ] **PhD in "Physics and Nanoscience"**

*University of Salento - Department of Mathematics and Physics "E. De Giorgi"*

**Address:** Lecce, Italy

**Field(s) of study:** Natural sciences, mathematics and statistics : *Physics*

**Thesis:** Simulating Mars: General Circulation Models and surface reflectivity maps

[ 2013 ] **Master's Degree in Physics**

*University of Salento - Department of Mathematics and Physics "E. De Giorgi"*

**Address:** Lecce, Italy

**Field(s) of study:** Natural sciences, mathematics and statistics : *Physics*

**Thesis:** Studio archeoastronomico del sito megalitico di Göbekli Tepe (Turchia)

[ 2011 ] **Bachelor Degree in Physics**

*University of Salento - Department of Mathematics and Physics "E. De Giorgi"*

**Address:** Lecce, Italy

**Field(s) of study:** Natural sciences, mathematics and statistics : *Physics*

**Thesis:** Paleoastrometria stellare: effetti della precessione dell'asse terrestre e dei moti propri

[ 2006 ] **Scientific high school diploma**

*Liceo Scientifico "Banzi Bazoli"*

**Address:** Lecce, Italy

[ 07/2020 ] **Acquisition of the 24 cfu for the training course for teachers (D.M. 616)**

*Online University eCampus, section of Lecce*

**Main subject / occupational skills covered:**

## LANGUAGE SKILLS

---

**Mother tongue(s):** Italiano

**Other language(s):**

**Inglese**

**LISTENING C1 READING C1 WRITING C1**

**SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2**

## DIGITAL SKILLS

---

Excellent knowledge of the Windows System and Office package | Great knowledge of the Linux-based Operating system | Excellent data manipulation skills with Origin, Matlab and NCL software | Good programming skills in Matlab and NCL | Basic programming skills in Python | Big data analysis for e-science by means of Ophidia (CMCC) tool | Parallel computing on Athena and Zeus (CMCC) clusters | Porting of the Marsis simulator code on Athena cluster

## PUBLICATIONS

---

[ 2015 ]

### **New Possible Astronomic Alignments at the Megalithic Site of Göbekli Tepe, Turkey**

<http://dx.doi.org/10.4236/ad.2015.31005>

**Reference:** AD, Archaeological Discovery di Scientific Research Publishing- Vol. 3, No.1, pp. 40- 50

**Authors:** [A. De Lorenzis](#), V. Orofino

**Scientific fields:** Archaeoastronomy, Astronomy, Archaeology

[ 2015 ] **Archaeoastronomical Study of the megalithic site of Göbekli Tepe, Turkey**

**Reference:** 2014 Activity Report del Dipartimento di Matematica e Fisica "Ennio De Giorgi", Università del Sale

**Authors:** [A. De Lorenzis](#), V. Orofino

**Scientific fields:** Archaeoastronomy, Astronomy, Archaeology

[ 2018 ]

### **Comparison of astronomical software for archaeoastronomical applications**

<https://doi.org/10.1016/j.ascom.2018.09.006>

**Reference:** Astronomy and Computing, 25, (2018), 118–132

**Authors:** [A. De Lorenzis](#), V. Orofino

**Scientific fields:** Applied computing astronomy, Archaeoastronomy, Astrometry, Software verification, Ephemerides

[ 2021 ] **Simulations of Martian climate**

**Reference:** Astronomy and Computing (under review)

**Full title:** Simulations of Martian climate: comparison between GCM output and in-situ data of surface and near-surface temperatures

**Authors:** [A. De Lorenzis](#), V. Orofino, G. Aloisio, G. De Nunzio

**Scientific fields:** Applied computing astronomy, Mars Climate, General Circulation Models, Software comparison, Big Data Analysis

**Topics:** Analysis of the output generated by the most diffused and used Mars climatic software simulators, *MarsCAM-NCAR*, installed on the *Athena* (CMCC) cluster, and the *GCM - LMD*. Comparisons with meteorological observational data collected by all the landers/rovers that explored/are exploring Mars. In details, study of the trends of the surface and near-surface temperatures. Manipulation of the output created by the software by means of the big-data tool *Ophidia* (CMCC) and Matlab.

## CONFERENCES AND SEMINARS

---

[ 24/10/2019 ] **What's the weather like... on Mars?** University of Salento - Department of Mathematics and Physics "E. De Giorgi"

**Contents:** Presentation and discussion of the present Mars climate conditions and in-depth analysis of the meteorological data collected by the various landers/rovers that explored/are exploring the Red Planet. Discussion on the scientific goals and results obtained by each mission.

[ 24/10/2019 ]

### **Simulating the present and past climate of Mars by means of General Circulation Models (GCM)**

University of Salento - Department of Mathematics and Physics "E. De Giorgi"

**Contents:** Simulation of meteorological variables for the reproduction of present and past Mars climate conditions. Comparison between the output of two GCMs (*MarsCAM-NCAR* e *GCM-LMD*) and the observations of surface and near-surface temperature collected by the various landers/rovers that explored/are exploring Mars.

[ 31/07/2017 ] **The MarsCAM software: simulation of the present and past Mars climate**

University of Salento - Department of Mathematics and Physics "E. De Giorgi"

#### **Contents:**

**Tematiche affrontate:** Introduzione all'installazione di un modello climatico di simulazione del pianeta Marte (*MarsCAM-NCAR*) sul cluster *Athena* (CMCC). Porting, managing e data analysis delle variabili di output per mezzo del tool *Ophidia* (CMCC).

## **COMMUNICATION AND INTERPERSONAL SKILLS**

---

### **Scientific dissemination - "2019 European Researchers' Night"**

**Date:** 29/09/2019

**Location:** Monastero degli Olivetani, Lecce (Italia)

**Contents:** Presentation of two posters titled: "Che tempo fa... su Marte?" and "La scoperta dell'acqua su Marte"

### **Scientific dissemination - "2017 European Researchers' Night"**

**Date:** 29/09/2017

**Location:** Monastero degli Olivetani, Lecce (Italy)

**Contents** Atmospheric aerosol: measurement methods and effects on human health, the environment and the earth's climate

### **Scientific dissemination - 2017 Scientific culture week**

**Date:** 06/04/2017 - 09/04/2017

**Location:** University of Salento and "Sigismondo Castromediano" Museum, Lecce (Italy)

**Contents:** Solar System exhibition, Visit to the Planetarium, Experiments for everybody

### **Tutoring activities within the project: "Alternanza scuola-lavoro: physical computing con Arduino"**

**Date:** 29/01/2018 - 09/02/2018

**Location:** University of Salento - Department of Mathematics and Physics "E. De Giorgi"

**Scientific supervisor:** Prof. G. De Nunzio (University of Salento)

**Contents:** Support for teaching and programming computer code on Arduino boards for the construction of small robots capable of executing movement instructions

### **Tutoring activities within the project: "Alternanza scuola-lavoro: physical computing con Arduino"**

**Date:** 10/02/2017

**Location:** University of Salento - Department of Mathematics and Physics "E. De Giorgi"

**Scientific supervisor:** Prof. G. De Nunzio (University of Salento)

**Contents:** Support for teaching and programming computer code on Arduino boards for the construction of small robots capable of executing movement instructions

## LINGUISTIC CERTIFICATION

---

[ 25/07/2014 ] **FIRST Certificate in English, Level B2**

**Certifying agency:** Cambridge English, Language Assessment (Part of The University Of Cambridge)

**Certification:** FIRST Certificate in English, Level B2 – Cambridge English Level 1 Certificate in ESOL International (First)

## IT CERTIFICATIONS

---

[ 16/05/2014 ] **ECDL Full Standard**

**Certifying agency:** AICA (Associazione Italiana per l'Informatica ed il Calcolo Automatico), certified by ACCREDIA

**Certification acquired:** ECDL Full Standard

[ 17/05/2004 ] **ECDL Core**

**Certifying agency:** AICA (Associazione Italiana per l'Informatica ed il Calcolo Automatico), certified by ACCREDIA

**Certification acquired:** ECDL Core

## DRIVING LICENCE

---

**Cars:** B

## CV LAST UPDATE

---

**02 Dicembre 2021**

## AUTHORIZATION

---

**In compliance with the Italian legislative Decree no. 196 dated 30/06/2003, I hereby authorize the use and processing of my personal details contained in this document.**