Leonardo Aragão

DSc. Research Fellow at Dept of Physics and Astronomy
University of Bologna (UniBO)
BOLOGNA, ITALY

Profile

Bachelor's degree in meteorology (2009), Master's degree in Mechanical Engineering (2012), and Doctor of Science degree in Mechanical Engineering (2018) by the Federal University of Rio de Janeiro with an exchange period in University of Bologna, Italy. Acted as a lecturer in the Department of Meteorology at Federal University of Rio de Janeiro between 2017 and 2018. Currently, he acts as a research fellow at the University of Bologna to OPERANDUM project (H2020). His research has focused on cyclones climatology, atmospheric boundary layer processes and its relations with air quality problems.

Keywords: Cyclones, Climatology, Reanalysis Data, Weather Forecast, Atmospheric Mesoscale Modelling, Micrometeorology, Air Pollution, Air Quality Policies, GeoData Science, Wolfram Mathematica, correlated areas.

Work and Academic Experience

Research Fellow at Centre for Research in Environmental Sciences at University of Bologna (UniBO), Italy.

January 2021 – December 2021

Position in the project *CLIMate change information, monitoring and management tools for adaptation strategies in ADRIAtic coastal areas (ADRIACLIM)*, funded by the Italy-Croatia Interreg Cooperation Programme.

Main activities on **WP3** Coastal Marine Environment – **Tasks 3.1** Design and implementation of the observing system updates, **3.3** Quality control of the observations and validation of the modelling systems, **3.4** Integration and assessment of monitoring (observations and models) components information for each pilot; and **WP4** Monitoring and Information System – **Task 4.2** Data transformation and climate impact indicators development.

https://www.italy-croatia.eu/web/adriaclim

Birth

Jan 6th 1986
Rio de Janeiro

Nationality

Brazilian

Address

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Bologna, 40126
Italy

Contact

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Scientific Profiles

UniBO
Lattes
OrcID

Social Profiles

Leonardo Aragão
leo.aragao
aragao1986

Teaching Tutor at Dept of Physics and Astronomy at University of Bologna (UniBO), Italy.

September 2020 – December 2020

Laboratory of Atmospheric Physics [Cod 70547]
Second cycle degree programme (LM) in Physics of the Earth System

Research Fellow at Dept of Physics and Astronomy at University of Bologna (UniBO), Italy.

January 2019 – December 2020

Position in the project *OPEn-air laboRAtories for Nature baseD solUtions to Manage hydro-meteo risks (OPERANDUM)*, a European Union's H2020 research and innovation programme under grant agreement No 776848.

Main activities on **WP1** – **Task 1.2** Critical evaluation of risks and opportunities for OPERANDUM OALs; **WP3** – **Task 3.1** Report on Standards for OPERANDUM OALs; and **WP4** Data Collection and Monitoring – **Task 4.2** Climatology of extreme events in the OAL regions.

https://www.operandum-project.eu/

Lecturer at Department of Meteorology at Federal University of Rio de Janeiro (UFRJ), Brazil.

March 2017 – December 2018

Paper:
- Introduction to Atmospheric Sciences
- Micrometeorology
- General Topics of Geosciences
- Chemistry and Physics of Atmosphere
- Fundamentals of Boundary Layer

Computer Skills

- WRF
- AERMET/AERMOD
- Wolfram Mathematica
- Fortran
- Python
- R
- Shell Script
- GrADS
- AutoCAD
- Microsoft Office
- Windows
- Linux

Languages

- Portuguese (Native)
- English
- Italian

Educational

Doctor of Science at Mechanical Engineering
at Federal University of Rio de Janeiro (UFRJ), Brazil.

October 2012 - May 2018

Advisors: Fernando Pereira DUDA and Luiz Claudio Gomes PIMENTEL with a collaborative period in Università di Bologna (Co-Advisor.: Silvana DI SABATINO).

Grantee (Scholarship): Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, CAPES, Brazil.

Thesis: "ANALYSIS OF THE INTERNAL BOUNDARY LAYER FORMATION OVER TROPICAL COASTAL REGIONS USING ACOUSTIC SOUNDINGS DATA AND THE ATMOSPHERIC MODEL WRF"

Keywords: Internal Boundary Layer; Atmospheric Boundary Layer; Sea/Land Breeze; SODAR; WRF.

Master of Science at Mechanical Engineering
at Federal University of Rio de Janeiro (UFRJ), Brazil.

March 2010 - June 2012

Advisors: Fernando Pereira DUDA and Jesús Salvador PÉREZ GUERRERO.

Grantee (Scholarship): Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, CAPES, Brazil.

Master's Thesis: "ANALYTICAL SOLUCTION OF ADVECTION-DIFFUSION-DEPOSITION TRANSPORT EQUATION USING INTEGRAL TRANSFORM TECHNIQUE "

Keywords: Air Quality; Air Pollution Modeling; Dry Deposition; Transport Equation; Analytical Solution; GITT.

Bachelor of Meteorology
at Federal University of Rio de Janeiro (UFRJ), Brazil.

March 2010 - June 2010

Advisors: Luiz Cláudio Gomes PIMENTEL

Grantee (Scholarship): National Council for Scientific and Technological Development, CNPq, Brazil.

Bachelor's Thesis: "SIMPLIFIED COMPUTATIONAL MODELING OF THE KINETICS FORMATION OF TROPOSPHERIC OZONE"

Keywords: Ozone; Alternative Fuels; Air Quality; Air Pollution Modeling; Atmospheric Chemistry.

Editorial Boards

Advan. Meteoro.
Advances in Meteorology
Hindawi, United States.
ISSN 1687-9317

AIGEO
Anuário de Geociências da Universidade Federal do Rio de Janeiro, Brazil.
ISSN 1982-3908

Appl. Sci.
Applied Sciences
MDPI, Switzerland.
ISSN 2076-3417

Atmosphere
Atmosphere
MDPI, Switzerland.
ISSN 2073-4433

BAST
Bulletin of Atmospheric Science and Technology
Springer, Switzerland.
ISSN 2662-1509

IJERPH
International Journal of Environmental Research and Public Health
MDPI, Switzerland.
ISSN 1660-4601

Nat Hazards
Natural Hazards
Springer, Switzerland.
ISSN 1573-0840

Sustainability
Sustainability
MDPI, Switzerland.
ISSN 2071-1050

Publications

01 Cyclonic activity in the Mediterranean Region from a high-resolution perspective using ECMWF ERA5 Dataset

ARAGÃO, L. and Porcù, F.

Climate Dynamics – Preprint DOI 10.21203/rs.3.rs-390147/v1.

02 Assessment of WRF/CALMET/CALPUFF Air Quality Regulatory Modeling System as a Support for Land Use Policies in Brazilian Metropolitan Regions in the Context of the UN Sustainable Development Goals - 2030 Agenda

SOARES DA SILVA, M.; ARAGÃO, L.; Pimentel, L.C.G.; Silva, C. and Duda, F.P.

Land Use Policy – Accepted in Major Review in May 2021.

03 Towards an operationalisation of nature-based solutions for natural hazards

KUMAR, P.; Debele, S.E.; Sahani, J.; ARAGÃO, L.; Barisani, F.; Basu, B.; Bucchignani, E.; Charizopoulos, N.; Di Sabatino, S.; Domeneghetti, A.; Sorolla Edo, A.; Finér, L.; Gallotti, G.; Juchl, S.; Leo, L.S.; Loupis, M.; Mickovski, S.P.; Panga, D.; Pavlova, I.; Pilla, F.; Löchner Prats, A.; Renaud, F.G.; Rutzinger, M.; Basue, A.S.; Shah, M.A.R.; Soini, K.; Stefanopoulou, M.; Toth, E.; Ukonmaanaho, L.; Vranic, S. and Zieher, T.

Science of the Total Environment, v.731, 138855, 2020.

04 Hydro-meteorological risk assessment methods and management by Nature-Based Solutions

SAHANI, J.; Kumar, P.; Debele, S.E.; Spyrou, C.; Loupis, M.; ARAGÃO, L.; Porcù, F.; Shah, M.A.R.; Di Sabatino, S.

Science of the Total Environment, v. 696, p.1-13, 2019.

05 ITCZ seasonal migration over the Brazilian northeast through vertical wind profiles during the 2008-2018 period

MACHADO, V.M.; ARAGÃO, L. and Pimentel, L.C.G.

Conference paper: XX Congresso Brasileiro de Meteorologia, Maceió, Brazil, v.6. p. 1672-1678, 2018.

06 Analysis of the Internal Boundary Layer formation on tropical coastal regions using SODAR data in Rio de Janeiro (Brazil)

ARAGÃO, L.; Di Sabatino, S.; Pimentel, L.C.G. and Duda, F.P.

International Journal of Environment and Pollution, v.62, p.136-154, 2017.

07 Analysis of the Internal Boundary Layer formation on tropical coastal regions using SODAR data in Santa Cruz region of MRRJ

ARAGÃO, L.; Di Sabatino, S.; Pimentel, L.C.G. and Duda, F.P.

Conference paper: 17th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes (HARMO 17), Budapest, Hungary, v.17. p.294-298, 2016.

08 Simplified Modeling of Tropospheric Ozone Formation Considering Alternative Fuels Using

ARAGÃO, L.; Perez-Guerrero, J.S. and Pimentel, L.C.G.

Anuário do Instituto de Geociências da UFRJ, v.37.2, p.151-160, 2014.

09 Estimative of the convective boundary layer height in Rio de Janeiro, Brazil, using the AERMET model with different upper air meteorological data

SOARES, M.S.; ARAGÃO, L.; Moraes, N.O.; Cremonini, D. and Pimentel, L.C.G.

Conference paper: XVII Congresso Brasileiro de Meteorologia, Gramado, Brazil, 2012.

10 Study case of a Mesoescale Convective System associated to a frontal system in Rio de Janeiro

GUIMARAES, J. M.; Oliveira, N.S.; ARAGÃO, L.; Lewis, B.S.; Hermsdorff, J.V.F. and Dereczynski, C.P.

Conference paper: X Congreso Argentino de Meteorología e XIII Congreso Latinoamericano e Ibérico de Meteorología. Buenos Aires, Argentina, 2009.

11 Simplified Computational Modeling of the Kinetics Formation of Tropospheric Ozone

ARAGÃO, L. and Pimentel, L.C.G.

Conference paper: XV Congresso Brasileiro de Meteorologia, São Paulo, Brazil, 2008.

12 Atmospheric modelling of the Metropolitan Region of Rio de Janeiro with CALMET

SOARES, M.S.; Pimentel, L.C.G.; Oliveira, J.F.J.; Correa, E.B. and ARAGÃO, L.

Conference paper: V Brazilian Micrometeorology Workshop, Santa Maria, Brazil, 2007.

13 Characterization of Brazilian desertification areas through NCEP/NCAR reanalysis and numerical modeling

OLIVEIRA JUNIOR, J.F.; Cavalcanti, A.S.; ARAGÃO, L. and Moraes, P.L.S.

Conference paper: 8th International Conference on Southern Hemisphere Meteorology and Oceanography, Foz de Iguaçu, Brazil, v.1. p.927- 934, 2006.

14 Climate change impacts on the agro-climatic potential of sugarcane and tomato crops in the significantly producing municipalities in Rio de Janeiro, Brazil

ARAGÃO, L.; Santos, R.G. and Paiva, C.M.

Conference paper: XIV Congresso Brasileiro de Meteorologia, Florianópolis, Brazil, 2006.

15 Climate change impacts on the agro-climatic potential of beans and manioc crops in the significantly producing municipalities in Rio de Janeiro, Brazil

SANTOS, R.G.; ARAGÃO, L. and Paiva, C.M.

Conference paper: XIV Congresso Brasileiro de Meteorologia, Florianópolis, Brazil, 2006.

Main Conference Abstracts

North-Atlantic Oscillation-related impacts on precipitation over the Italian Peninsula during the 1979-2020 period

SANCHEZ, P. L. and ARAGÃO, L.

European Geosciences Union - General Assembly, Vienna, Austria, 2021.

Observational evidence of urban heat island intensification during heatwaves in European cities

POSSEGA, M; ARAGÃO, L.; Ruggieri, P.; Santo, M. A. and Di Sabatino, S.

European Geosciences Union - General Assembly, Vienna, Austria, 2021.

Revisiting cyclone detection and tracking methods using ECMWF ERA5 dataset for climatological purposes in the Mediterranean Region

ARAGÃO, L. and Porcù, F.

European Geosciences Union - General Assembly, Vienna, Austria, 2020.

Extreme wave events attribution using ERA5 datasets for storm-surge studies in the northern Adriatic sea

PORCÙ, F.; ARAGÃO, L.; Aguzzi, M.; Valentini, A.; Debele, S.E.; Kumar, P.; Loupis, M.; Montesarchio, M.; Mercogliano, P. and Di Sabatino, S.

European Geosciences Union - General Assembly, Vienna, Austria, 2020.

A copula-based multivariate drought indicator to design and monitor nature-based solutions

DEBELE, S.E.; Sahani, J.; Porcù, F.; ARAGÃO, L.; Spyrou, C.; Loupis, M.; Charizopoulos, N.; Di Sabatino, S. and Kumar, P.

European Geosciences Union - General Assembly, Vienna, Austria, 2020.

Evaluation of heatwave episodes in the city of Rio de Janeiro during the period from 2003 to 2015.

PONTES, A.S.; Soares, M.S.; ARAGÃO, L.; Moraes, N.O.; Soares, A.; Pimentel, L.C.G.; Silva, C.

Anais do XIX Congresso Brasileiro de Meteorologia, João Pessoa, Brazil, 2016.

Comparison of clouds ceiling height data in the Santa Cruz region with the atmospheric boundary layer height obtained via AERMET.

HOFFMAN, M.S.; ARAGÃO, L.; Pimentel, L.C.G.

Anais da XXXVII Jornada Giulio Massarani de Iniciação Científica, Tecnológica, Artística e Cultural UFRJ. Rio de Janeiro, Brazil, v.37. p.1310–1310, 2015.

Temperature and vertical wind profile characterization into the atmospheric boundary layer of Air Basin I of RMRJ

ARAGÃO, L.; Soares, M.S.; Albani, R.A.S.; Duda, F.P.; Pimentel, L.C.G.

Anais do XVIII Congresso Brasileiro de Meteorologia, Recife, Brazil, 2014.

Surface wind climatology in Lagos and North Fluminense regions via METAR

PIZZOCHERO, R.M.; Marton, E.; ARAGÃO, L.; Soares, M.; Pimentel, L.C.

Anais do XVIII Congresso Brasileiro de Meteorologia, Recife, Brazil, 2014.

Comparison of SO_2 concentration via AERMOD and measurements in BAIII of RMRJ

LORENA, V. S. A.; VILLELA, M. O.; CAREGA, N. O.; PIMENTEL, L. C. G.; SOARES, M. S.; ARAGÃO, L.

Anais da XXXIV Jornada Giulio Massarani de Iniciação Científica, Tecnológica Artística e Cultural UFRJ. Rio de Janeiro, Brazil, v.34. p.423-423, 2012.

Teaching Experience

Laboratory of Complex Systems Simulations • Open Physics Hub

University of Bologna (UniBO), Bologna, Italy, 4 hours, January 2021.

Laboratory of Synoptic Charts • Atmospheric Physics and Meteorology

University of Bologna (UniBO), Bologna, Italy, 4 hours, December 2020.

Laboratory of Atmospheric Sounding • Atmospheric Physics and Meteorology

University of Bologna (UniBO), Bologna, Italy, 4 hours, November 2020.

Laboratory of Atmospheric Physics [Cod 70547] • Earth System Physics

University of Bologna (UniBO), Bologna, Italy, 15 hours, Academic Year 2020/2021.

Laboratory of Synoptic Charts • Atmospheric Physics and Meteorology

University of Bologna (UniBO), Bologna, Italy, 8 hours, Academic Year 2019/2020.

Laboratory of Atmospheric Sounding • Atmospheric Physics and Meteorology

University of Bologna (UniBO), Bologna, Italy, 6 hours, Academic Year 2019/2020.

Laboratory of Atmospheric Modelling • Dynamic Meteorology

University of Bologna (UniBO), Bologna, Italy, 8 hours, Academic Year 2018/2019.

Introduction to the regulatory air quality model AERMOD.

Rio de Janeiro State Environmental Institute (INEA-RJ), Rio de Janeiro, Brazil, 24 hours, 2017.

Technical training on AERMOD functionalities.

Rio de Janeiro State Environmental Institute (INEA-RJ), Rio de Janeiro, Brazil, 24 hours, 2016.

Introduction to FORTRAN90.
Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil, 12 hours, 2014.

Introduction Meteorology and Oceanography to Navigators.
Instituto Rumo Náutico, Rio de Janeiro, Brazil, 12 hours, 2011.

Teaching Tutor at Department of Meteorology
at Federal University of Rio de Janeiro (UFRJ), Brazil.

Grantee (Scholarship): National Council for Scientific and Technological Development, CNPq, Brazil.

January-June 2009
Support to Professor D.Sc. Edson MARQUES FILHO during classes of "Thermodynamics of Atmosphere"

July-December 2009
Support to Professor D.Sc. Claudine DERECZYNSKI during classes of "Synoptic Meteorology"

Academic Advising Activities

Alberto Pio Rupi
Physics Undergraduate Student at University of Bologna, Italy.
Research: Analysis of extreme precipitation events in Central Italy.
June 2020 – March 2021. 2

Jacopo Grassi
Physics Undergraduate Student at University of Bologna, Italy.
Research: Drought in the Po river basin: Evaluation of 1979-2019 period using the ERA5 climate dataset.
November 2019 – March 2020.

Matilde Torrassa
Physics Undergraduate Student at University of Bologna, Italy.
Research: Temperature and precipitation trends in Italy from 1979 to 2019.
September 2019 – March 2020.

Vinícius de Menezes Machado
Meteorology Undergraduate Student at Universidade Federal do Rio de Janeiro, Brazil.
Research: ITCZ seasonal migration over the Brazilian northeast through vertical wind profiles.
August 2018 – Present

Isabela dos Santos Pereira Rubatino
BCMT Undergraduate Student at Universidade Federal do Rio de Janeiro, Brazil.
Research: Identifying Urban Heat Island into the Rio de Janeiro Metropolitan Region using the Climate Engine
April 2018 – September 2018

Matheus da Silva Hoffman
Meteorology Undergraduate Student at Universidade Federal do Rio de Janeiro, Brazil.
Research: Correlation assessment between the micrometeorological parameters and the air quality levels into the Air Basin I of the Rio de Janeiro Metropolitan Region.
September 2014 – December 2015.

Villian Lorena da Silva Araújo

Environmental Technician Student at Colégio Pedro II, Rio de Janeiro, Brazil.

Research: Análise Comparativa da Concentração de Dióxido de Enxofre via AERMOD e Dados de Monitoramento para a BAIII da RMRJ.

April 2012 – December 2012.

Participation in Examination Boards

Investigation of the atmospheric circulation and its response to local forcings in Guanabara Bay (RJ)

FERNANDES, T.; Assad, L.P.F.; Dragaud, I.D.; ARAGÃO, L.; Menezes, W. e Pimentel, L.C.G.

Bachelor Thesis in Meteorology – Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, 2021.

Numerical evaluation of the SST and parameterization influences on tropical cyclone tracks in the Atlantic Ocean

VANZAN, M.E.P.; Cataldi, M.; ARAGÃO, L.; Palmeira, A.C.

Master's Thesis in Biosystems Engineering – Fluminense Federal University, Brazil, 2020.

Evaluation of Monin- Obukhov's Similarity Theory in Santa Cruz Region, Brazil

DUMAS, B.P.; Pimentel, L.C.G.; Albuquerque Neto, F.L.; ARAGÃO, L.; Assad, L.P.F.; Soares, M.S.

Bachelor Thesis in Meteorology – Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, 2018.

Evaluation of the continental penetrability of marine spray in Barra da Tijuca, using the wet sail method

MACCACHERO, D.P.; Tavares, P.S.; Maia, L.F.P.G.; Pertel, M.; ARAGÃO, L.

Bachelor Thesis in Environmental Engineering – Federal University of Rio de Janeiro, Rio de Janeiro, Brazil, 2017.