Carolina Veiga Ferreira de Souza

Environmental Engineer

Profile

I have been working with numerical weather modeling data and data visualization. I am interested in practicing and improving my knowledge as a researcher in weather forecasting and data science projects applied to real-world problems, mainly addressing environmental demands.

Education

2018 – 2023	**Ph.D. in Computing** Federal Fluminense University Advised by Prof. Marcos Lages and co-advised by Prof. Marcio Cataldi Ph.D. thesis: Visual management and analysis of weather forecasts ensembles Supported by CAPES	Niterói, RJ, Brazil
2013 – 2016	**M.S. in Biosystems Engineering** Federal Fluminense University Advised by Prof. Marcio Cataldi M.Sc. thesis: Numerical evaluation of the influence of urbanization in the convection and precipitation patterns in the Metropolitan Region of São Paulo Supported by CAPES	Niterói, RJ, Brazil
2008 – 2013	**B.S. in Environmental Engineering** Federal Fluminense University Advised by Prof. Mônica da Hora B.Sc. thesis I: Ecological flow estimation in a stretch of the Paracatu river using the wetted perimeter method B.Sc. thesis II: Ecological flow estimation in a stretch of the Piabanha river using the wetted perimeter method	Niterói, RJ, Brazil

Complementary Education

2021	**Specialization in Climate and Energy: Variability and Impacts** State University of the North Fluminense Advised by Prof. Maria Gertrudes Justi and co-advised by Prof. Fabricio Polifke Thesis: Disaster in the mountainous region of RJ: numerical analysis using different parameterization sets in the WRF model	Macaé, RJ, Brazil

Professional Experience

Jun 2023 - currently	**Research Scholar Through the U.S. Department of State** Discovery Partners Institute at the University of Illinois	Chicago, IL, US
Jun-Dec 2021	**Researcher of Research and Development Project** AMBMET CONSULTORIA LTDA for Casa dos Ventos Comercializadora de Energia S.A, with co-participation of the Federal Fluminense University Research Project: "Study to improve short- and medium-term discharge forecasting"	Niterói, RJ, Brazil
Jan-Jun 2018	**Researcher of Research and Development Project** AMBMET CONSULTORIA LTDA for Statkraft, with co-participation of the Federal Fluminense University Research Project: "Implementation of a conceptual rainfall-discharge model for scenario forecasting"	Niterói, RJ, Brazil
Jan-Jun 2018	**Researcher of Research and Development Project** AMBMET CONSULTORIA LTDA for Valora Energia, with co-participation of the Federal Fluminense University Research Project: "Implementation of a conceptual rainfall-discharge model for scenario forecasting"	Niterói, RJ, Brazil
Oct 2015 - Dec 2016	**Environmental Engineer** State Institution of the Environment (INEA -RJ)	Rio de Janeiro, RJ, Brazil

	Research Project: "Development of a discharge prognostic system prototype by ensemble in quick response basins in support of prevention of natural disasters". Supported by CNPq	
Oct 2013	**Member of extension project as M.S. student** Federal Fluminense University Diagnosis of basic sanitation conditions of Oriximiná City (PA), aiming support to the elaboration of sanitation plans, programs, and projects; Elaboration of the draught bills of the Municipal Policy on Basic Sanitation and Solid Waste and the Municipal Plan of Basic Sanitation	Oriximiná, PA, Brazil
2012 - 2013	**Research project member as an undergraduate student** Federal Fluminense University Research Project: "Development of a weather numerical prediction system by high spatial resolution ensemble to the Niterói City (RJ)"	Niterói, RJ, Brazil
2009 - 2011	**Engineer Intern** Eletrobrás Furnas Development of the Annual Greenhouse Gas (GHG) Inventory in 2009, 2010 and 2011, including the study of methodologies, correction, and improvement of the excel spreadsheets, presentation and training given; Development of the computerized system for collecting company data needed for the GHG Inventory.	Rio de Janeiro, RJ, Brazil

Publications

J: journal, C: conference/symposium, W: workshop

<u>Under review</u>

[J] 2023   Natural Hazard in Nova Friburgo (Brazil): Numerical sensitivity analysis using different parameterization combinations in the WRF model
C. V. F. de Souza, M. Justi, F. Polifke
Natural Hazards

<u>Accepted</u>

[J] 2023   PROWIS: A visual approach for configuring, running and analyzing weather simulation ensembles in runtime
C. V. F. de Souza, S. Bonnet, M. Cataldi, D. Oliveira, F. Miranda, M. Lage
IEEE VIS 2023

[J] 2023   Division problems: interpretation, solution and planning in Lesson Study
M. A. de Souza, **C. V. F. de Souza**
XVI Interamerican Conference on Mathematics Education

[J] 2022   Visualizing simulation ensembles of extreme weather events
C. V. F. de Souza, P. C. L. Barcellos, L. Crissaff, M. Cataldi, F. Miranda, M. Lage.
Computer & Graphics, v. 104, p. 162-172

[J] 2022   A comparative study of methods for the visualization of probability distributions of geographical data
S. Srabanti, **C. V. F. de Souza**, E. Silva, M. Lage, N. Ferreira, F. Miranda.
Multimodal Technologies and Interaction, 6 (7):53

[J] 2021   Financial education and sustainable development: a systematic literature review
R. Leffer, **C. V. F. de Souza**, M. A. de Souza
International Journal of Studies in Mathematics Education

[C] 2021   Oil production and environmental externalities: the case of oil spill in northeastern Brazil in 2019
L. Martins, **C. V. F. de Souza**, L. R. Monteiro, L. Santos
Symposium on Climate, Water, Energy and Food (SIMCLEA)

[C] 2017   Methodology for developing a flood prediction system for the Piabanha and Paquequer rivers pilot basins, Mountain Region of Rio de Janeiro.
L. T. Chargel, D. Amaral, J. E. Falcão, **C. V. F. de Souza**
XXII Brazilian Water Resources Symposium

[C] 2017	Two-dimensional hydrodynamic modeling applied to delimitation of flood spots in the Paquequer river basin – Teresópolis/RJ

[C] 2017   Two-dimensional hydrodynamic modeling applied to delimitation of flood spots in the Paquequer river basin – Teresópolis/RJ
L. T. Chargel, D. Amaral, L. F. da Costa, J. E. Falcão, **C. V. F. de Souza**, V. Albernaz, J. P. Fraga, J. P. Rezende
XXII Brazilian Water Resources Symposium

[C] 2017   Hydrodynamic simulation in flood risk management: a case study of the Piabanha river basin, in Petrópolis – RJ
L. T. Chargel, D. Amaral, J. E. Falcão, **C. V. F. de Souza**, J. P. Rezende, V. Albernaz, J. P. Fraga
XXII Brazilian Water Resources Symposium

[J] 2017   Numerical evaluation of the influence of urbanization in the convection and precipitation patterns in the Metropolitan Region of São Paulo.
C. V. F. de Souza, R. H. O. Rangel, M. Cataldi.
Brazilian Journal of Meteorology, v. 32(4), p. 495-508

[C] 2016   Precipitation and air temperature climatology in the Paraíba do Sul river basin
V. R. S. Santos, C. S. Brasiliense, R. Calado, **C. V. F. de Souza**, C. P. Dereczynski, C. S. Chou
XIX Brazilian Meteorological Congress

[C] 2015   Numerical evaluation of the influence of urbanization in the convection and precipitation patterns in the Metropolitan Region of São Paulo.
C. V. F. de Souza, R. H. O. Rangel, M. Cataldi.
VI International Symposium of Climatology
Top 20 work

[C] 2015   Numerical evaluation of the influence of urbanization in the convection and precipitation patterns in the Metropolitan Region of São Paulo.
C. V. F. de Souza, R. H. O. Rangel, M. Cataldi
IV Symposium on Environmental Management and Biodiversity

[C] 2013   Performance evaluation and calibration of the numerical weather prediction system by high spatial resolution ensembles for Metropolitan and Mountainous Regions of Rio de Janeiro State.
M. Cataldi, E. B. Correa, **C. V. F. de Souza**, F. F. Graça, J. P. M. Andrade, J. V. M. Miranda, J. S. Oliveira, M. S. Coelho, O. S. M. Smiderle
I Fluminense Congress of Engineering Technology and Environment

[C] 2013   Evaluation of the performance and results produced by the numerical weather prediction system by high spatial resolution ensembles for the Metropolitan and Mountainous Regions of Rio de Janeiro State
I Fluminense Congress of Engineering Technology and Environment
J. S. Oliveira, F. F. Graça, J. F. S. Vasconcellos, M. S. Coelho, J. V. M. Miranda, **C. V. F. de Souza**, R. S. Baptista, M. Cataldi, E. B. Correa

Advised Student

2014   **Undergraduate student (co-advisor)**
Clarice Buarque de Macedo Lira

Invited Talks and Presentations

[W] 2022   System to aid the creation, control, and visual analysis of numerical weather simulations
VI Climate Modeling Workshop (MODCLIM 6.0)

[W] 2021   Perspectives for the evolution of atmospheric modeling at LAMMOC/UFF - high-resolution MPAS and WRF.
IV Climate Modeling Workshop (MODCLIM 4.0)

Class Planning

2021-2023   Extension Course for Continued Education of Teachers in Financial Education for Sustainable Development
Multidisciplinary team member
Federal Institute of Espírito Santo

Software Skills

- Python (Numpy, Pandas, GeoPandas, Altair, Matplotlib, Flask, NetCDF4, WRF-Python, Scikit-Learn, Pymonetdb, GeoPy)
- JavaScript (Express.js, ReactJS, D3.js)
- Java | MySQL | MonetDB | Apache-Airflow | Linux | ArcGIS | QGIS | Microsoft package

Languages

Portuguese – native | English – advanced | Spanish – basic