Agustina Pesce Lopez

PhD Geophysics | Data Scientist | Physics | Software Developer | Python | GNU/Linux

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Professional Experience

Coding Coordinator and Trainer
Nov 2021 – on

Code to Communicate Program
A NSF-funded bilingual coding and science communication training program for early career geoscientists.

- **Collaborated** in different tasks such as **curriculum development**, **people management** and updating file records to create a good foundation for the 10-week program to teach Python and science communication.
- **Led** and **supervised** a team of 5+ trainers to teach how to code to 20 students, who proved good coding proficiency and communication skills by the end of the program.
- **Organized** and **supervised** a 1-week hackathon where participants developed a shared project using version control system and Jupyter notebooks, and communicated the achieved goals and results through public presentations.
- **Created** and **maintained** a GitHub repository with the course material: Jupyter Notebooks used to teach during each lesson.
- **Reported** the progress of the project to superior managers and external evaluators.

Postdoctoral Researcher
Apr 2019 – Mar 2022

Instituto Geofísico Sismológico Volponi, Argentina
Project title: *Influence of a mantle plume in subduction zones by geodynamics numerical models.*

- **Acquired** the knowledge to operate Mandyoc, a software for running geodynamical numerical simulations of the Earth's interior.
- **Developed** a Bash pipeline to create subduction models as inputs for Mandyoc, run the simulations remotely on Google Cloud Platform and download the outputs.
- **Built** tapioca: a Python package to transform and visualize the outputs of Mandyoc using Xarray and Matplotlib.
- **Gave** an online seminar to instruct lab members on how to handle multidimensional arrays with Xarray.
- **Presented** project results in international scientific meetings.

Assistant Professor of Practice
Oct 2019 – Mar 2022

Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de San Juan, Argentina

- **Led** the practice and lab classes of Physics courses for 30+ Geology students.
- **Evaluated** students' performance through quizzes, exams and laboratory practices.
- **Collaborated** in the lesson preparation and **participated** in Physics Lectures.
- **Set up** and **maintained** online classroom during the pandemic and **instructed** other Professors on how to take advantage of its tools.

PhD Researcher
Apr 2014 – Mar 2019

Instituto Geofísico Sismológico Volponi, Argentina
Thesis title: *Geophysical analysis of the Loncopué Trough, Neuquén, Argentina*

- **Developed** and **further explored** a project throughout a 5-year PhD which was **funded** by the Consejo Nacional de Investigaciones Científicas y Técnicas.

- **Compiled** and **preprocessed** gravity and magnetic datasets from different sources (ground and satellite) using specialized software and Python libraries like NumPy, Pandas, Xarray and Fatiando a Terra.
- **Applied geophysical processing steps** to produce interpretable maps of the study area.
- **Inverted** the gravity data to get better understanding of the underlying structures and bodies beneath the Earth's surface.
- **Published** research results in peer-reviewed scientific journals and **participated** in the writing of book chapters.
- **Presented** my research in international scientific meetings.
- **Organized**, **designed** and **took part** of field trips to perform data acquisition according to the needs of our team.
- **Assisted** my peers to improve their research, achieving higher quality scientific publications.

Projects

Maintainer of collaborative Python lesson
Jun 2022 – On

The Carpentries

- **Got assigned** the role of maintainer of Análisis y visualización de datos usando Python: one of the core lessons of The Carpentries.
- **Participated** in maintainers' meetings discussing how to improve the current version of the lesson.
- **Contributed** to the improvement of Control de versiones con Git lesson through reviewed GitHub Pull Requests.

Journal manager (Work in progress)
2022

Journal manager developed in Python to help me to organize my week's tasks and have a log file with my activities in different projects.

- **Designed** and **implemented** the code.

COVID-19 dashboard
2020

Visualization of the evolution of COVID-19 on each province of Argentina

- **Loaded**, **cleaned** and **processed** the data using Pandas.
- **Created interactive plots** showing the evolution of cases for each province using Plotly and Dash.
- **Developed** an interactive web application and **deployed** it on Heroku.

Mandyoc collaborator
Apr 2019 – On

Open source tool to simulate the mantle dynamics

- **Automated deployment** of the documentation website through GitHub Actions.
- **Designed and coded tests** to check the correct performing of the code using Pytest.
- **Worked** on community building adding license, code of conduct, how to contribute guidelines and Readme to improve the repository.
- **Restructured** the examples gallery using Jupyter notebooks to show how to use the code with real examples.
- **Developed** a Makefile for building and installing the program.
- **Collaborate** in the publication of Mandyoc code in the Journal of Open Source Software.

Fatiando a Terra collaborator
2016 – On

Open source tools for geophysics

- **Implemented new features** with unit tests using Pytest, documentation and an example of how to use it.
- **Improved** the main website project.
- **Created new examples notebook** explaining how to use the library.

- **Made maintenance tasks** to fix CI, code automated tasks and delete deprecated code.
- **Participated** in developers and community meetings to discuss how to improve the current tools, cultivate the community, design examples, etc.

Website developer 2021

- **Created website layouts** for different projects:
  - Diana Acero personal website.
  - Geolatinas coding group: organization website
  - CromoGráfica: business website currently under development.
- **Developed a clean code** for all projects and **deployed** it using GitHub Actions and GitHub Pages.
- **Maintained** and **updated** websites based on feedback.

Education

Oct 2022 – On	**Data Science Bootcamp Online**, from Código Facilito
2014 – 2019	**PhD in Geophysics**, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de San Juan, Argentina
2005 – 2014	**Licentiate in Physics**, Facultad de Ciencias Exactas, Ingeniería y Agrimensura, Universidad Nacional de Rosario, Argentina

Certifications

2022	Database course from Código Facilito
2022	Maintainer for The Carpentry
2021	Certified Software Carpentry Instructor

Technical Skills

Programming	Python (NumPy, Pandas, SciPy, Xarray, Matplotlib, Plotly, Dash, PyGMT), bash, FORTRAN, C, SQL
Database	MySQL
Markup	Markdown, LaTeX, HTML
WebDev	CSS, Bootstrap, Normalize, Static Site Generators (jekyll, urubu)
DevOps	GNU/Linux, Unix terminal, VIM, Neovim, VS Code, git, GNU Make, SSH
Other tools	Jupyter notebooks, JupyterLab, LibreOffice Suite, GitHub Actions, maxima, Inkscape, GIMP, Krita, Docker, Google Cloud Platform

Languages

Spanish	Native
English	Advanced

Service Work

Member of International GeoLatinas community
Support the community by giving Python and Git courses, developing the coding group website and mentoring other members on programming.

Member of The Carpentries community
Contribute to the community as a lesson maintainer and instructor.

Technical advisor in Climatematch Academy.
Collaborate in the creation of the infrastructure to develop the lessons, make the website and solve technical issues.

Awards and Scholarships

2019 – 2022	Postdoctoral Scholarship from Consejo Nacional de Investigaciones Científicas y Técnicas
2014 – 2019	PhD scholarship from Consejo Nacional de Investigaciones Científicas y Técnicas
2015	Travel grants: SEG/ExxonMobil Student Education Program (SEP), New Orleans, USA

Highlight Publications

Peer-reviewed papers

2022	Mandyoc: A finite element code to simulate thermochemical convection in parallel, *Journal of Open-Source Software, 7(71). 4070.*
2021	Sección eléctrica cortical a través de la fosa de Loncopué, *Revista de la Asociación Geológica Argentina 78 (2), 333–337.*
2020	Oligocene to present shallow subduction beneath the southern Puna plateau, *Tectonophysics.*

Books Chapters

2020	Pliocene to Quaternary Retroarc Extension in the Neuquén Basin: Geophysical Characterization of the Loncopué Trough, *Opening and closure of the Neuquén Basin in the Southern Andes, Springer*
2020	Plume Subduction Beneath the Neuquén Basin and the Last Mountain Building Stage of the Southern Central Andes, *Opening and closure of the Neuquén Basin in the Southern Andes, Springer*

Highlight Talks

2022	Mandyoc: A finite element code to simulate thermochemical convection in parallel, *presented at Transform 2022.*
2021	Introduction to Git and GitHub, *for GeoLatinas.*
2021	Fatiando a Terra: Open-source tools for geophysics, *Online talk given to the Geophysical Society of Houston (GSH).*
2021	Harmonica and Boule: Modern Python tools for geophysical gravimetry, *EGU2021 General Assembly.*

2020 Evaluation of the presence of a weak layer in the numerical simulation of lithospheric subduction, *EGU2020 General Assembly*.