Leonardo S. **Mateus Báez**

· Civil engineer - M.Sc. Civil Engineer - Geotechnics ·

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Civil Engineer with a Master's Degree in Geotechnical Engineering, specializing in numerical modeling, data processing, and programming for seismic hazards and risks. Passionate about exploring innovative methodologies to enhance data analysis and scientific approaches for addressing seismic hazards. Strong interest in seismic hazard, dynamic response, rock mechanics and hydromechanics in particular stress characterization. Feel free to visit my webpage.

Education

National University of Colombia — *Bogotá, Colombia*

Msc. Civil Engineering - Geotechnics — *2016 - 2020*

- Relevant courses: Seismology, Analysis Method in Geothecnics, Rock mechanics
- Research line in geotechnical risks
- Thesis: "Earthquake triggered landslides in Colombia", Advisor: Prof. Carlos E. Rodriguez

National University of Colombia — *Bogotá, Colombia*

Bsc. Civil Engineering — *Feb. 2010 - Apr. 2016*

- Relevant courses: Introduction to seismology, Fundamentals of Geophysics, Geophysical Methods, Numerical Methods
- Thesis: "Numerical modeling of retaining walls", Advisor: Prof. Carlos E. Rodriguez

Professional Experience

Meridian Consulting — *Bogotá*

Seismic Hazard and Risk — *Sept 2023 - Present*

Seismic Hazard and Risk for ECOPETROL

- Spatial and temporal analysis of seismicity
- Determination of the relationship between seismicity and fluid injection
- Analysis of Hydrogeological Models for Induced Seismicity using Modflow and Python
- Identification and Management of Seismic Risk in Oil Fields Resulting from Induced Seismicity

Geological Survey of Colombia, Seismic Hazard Assessment Group — *Bogotá*

Seismic Hazard Engineer — *Feb. 2020 - Sept 2023*

Seismic Hazard and Risk

- Participation in the execution of the seismic hazard and seismic risk project in Colombia: Pasto, Pereira, Tunja
- Generation of hazard maps for seismic scenarios using the Shakemap software and the OpenQuake platform

Soil Dynamic Response:

- Evaluation of the dynamic response of soils in one and two dimensions for seismic microzonation studies
- Two-dimensional numerical modeling of seismic amplifications using the Quad4M finite element program
- One-dimensional numerical modeling of seismic amplifications using the Deep soil
- Generation of finite element meshes for two-dimensional numerical modeling
- Interpretation of the results of the models using Python
- Geotechnical characterization of the cities Pasto, Pereira, and Tunja related to the evaluation of seismic risk and hazard
- Interpretation of dynamic triaxial tests and fitting the parameters to an extended hyperbolic model
- Support for SPAC geophysical exploration campaigns
- Estimation of seismic amplifications due to topography
- Estimation of seismic amplifications due to sedimentary basins

Signal Processing:

- Processing of accelerograms and interpretation of records from stations in several cities in Colombia using Python
- Handling of large seismological and geotechnical datasets using Python

Multi-Hazard Analysis:

- Analysis of landslides induced by earthquakes at different scales
- Analysis of landslides induced by earthquakes at different scales

Geological Survey of Colombia, National Seismological Network — *Bogotá*

Analyst — *Sep. 2017 - Jan. 2020*

- Data processing of information collected by the Colombian National Seismological Network (RSNC) and Colombian Accelerograph Network (RNAC).

Geotrie Ciencias e Ingeniería — *Bogotá*

Geotechnical engineer — *Sep. 2021 - Sep. 2023*

- Field work for natural hazards assessment, geotechnical characterization and landslide hazard analysis across multiple scales.

Consultant Carlos Eduardo Rodriguez Pineda *Bogotá*

Geotechnical engineer *Jan. 2017 - Aug. 2017*

- Geotechnical analysis and design of structures and conduits to optimize the water supply systems in the southern and northeastern hills of Bogotá.

Ingeniería y Georiesgos IGR S.A.S *Bogotá*

Geotechnical engineer *Jun. 2015 - Oct. 2016*

- Seismological data processing for the purpose of seismic hazard assessment and local response planning in support of Project: Seismic hazard of 52 bridges on "Mar 2" highway
- Geotechnical assessment for the restoration of the main water supply network.
- Geotechnical assessment of slope stability and foundation conditions for the Canoas water treatment plant.
- Processing and analysis of laboratory tests on soil and rock samples for infrastructure and building projects

Skills

Professional	Seismic hazard and risk, Geotechnical data management, Geotechnical Risks
Software	Plaxis, Slide, Quad4M, Modflow, Deepsoil, GiD
Programming	Python: Obspy, Numpy, Pandas.Javascript. Wolfram Mathematica, LaTeX, GDAL
Languages	Spanish (Native), English (B2)
GIS	ArcGIS, Leaflet
Webpage	https://sites.google.com/view/leonardo-mateus/home-page.

References

Hugo Esteban Poveda Nuñez *Bogotá, Colombia*

Doctor of Philosophy - PhD. Geophysics Universidade Federal do Rio Grande do Norte

Lecturer in Seismology at the Universidad de los Andes.

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- Researchgate: https://www.researchgate.net/profile/Esteban-Poveda

Maria Mónica Matilde Arcila Rivera *Bogotá, Colombia*

Doctor of Philosophy - PhD in Seismic Hazard and Geodynamics Universidad Complutense de Madrid

Group Leader of Seismic Hazard and Risk Assessment at the Servicio Geológico Colombiano..

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- Researchgate: https://www.researchgate.net/profile/Monica-Arcila

Carlos Eduardo Rodriguez Pineda *Bogotá, Colombia*

Doctor of Philosophy - PhD in Civil Engineering Imperial College, London

Lecturer in Geothecnical Engineering at the Universidad Nacional de Colombia.

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