

Exneyder A. Montoya-Araque

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Education

- 2022 – At present **Doctorate in Engineering**, *Universidad EAFIT (Colombia) and CentraleSupélec at Université Paris-Saclay (France)*, double degree via international cotutelle.
Advisors: Silvana Montoya-Noguera, *PhD.* & Fernando Lopez-Caballero, *PhD.*
- 2017 – 2019 **Master in Engineering – Geotechnics**, *Universidad Nacional de Colombia*, Medellín
Advisor: Lúdrger O. Suárez Burgoa, *PhD.*
- 2010 – 2016 **Geological Engineering**, *Universidad Nacional de Colombia*, Medellín
Advisor: Lúdrger O. Suárez Burgoa, *PhD.*

Academic Experience

Research

- Aug. 2017 – **Young Researcher**, *COLCIENCIAS – UNAL*, Medellín, Ant. Colombia
Aug. 2018 Research Title: Slope stability analysys in BIMs by the limit equilibrium method with the A* algorithm.

Teaching

- Jul. 2022 – **Adjunct Professor**, *Universidad EAFIT*, Medellín, Ant. Colombia
At present Laboratory of Applied Soil Mechanics (2022-2), Slope stability (2022-2 to 2024-1)
- Feb. 2021 – **Adjunct Professor**, *Universidad EIA*, Envigado, Ant. Colombia
At present Structural Geology (2021-1, 2022-2, 2024-1), Geomorphology (2021-2), General Geology (2022-1, 2022-2).

Industry Experience

- Jan. 2016 – **Assistant to Junior Specialist Engineer (employee contracts)**, *Ingeniería, Tecnología e Instrumentación S.A. - INTEINSA*, Medellín
Jan. 2022
- Apr. 2016 – **Assistant (freelance contract)**, *Corporación Ambiental Visión Verde*, Medellín.
Jun. 2016

Languages

Spanish
Native

English
B2

French
A2

IT Skills

- Programming Python 3, R, MatLab/Octave, LaTeX, Markdown.
Markup lang. LaTeX and Markdown.
OS Microsoft Windows and Linux: Ubuntu.
GIS ArcGis, QGis, Global Mapper, Google Earth
Drawing CAD: AutoCAD and Civil3D, Vector: Inkscape/CorelDraw, Raster: Gimp

Honors

- May 2019 Master's thesis with Laureate Distinction. *UNAL, Facultad de Minas*
Aug. 2016 Honor roll: Geological Engineer *UNAL, Facultad de Minas*

Publications

- [1] E. A. Montoya-Araque, S. Montoya-Noguera, and F. Lopez-Caballero, “An open-source application software for spatial prediction of permanent displacements in earthquake-induced landslides by the Newmark sliding block method: pyNewmarkDisp,” *Environmental Modelling & Software*, p. 105942, Jan. 2024.
- [2] E. A. Montoya-Araque and S. Montoya-Noguera, “Sensitivity Analysis of a Physically Based Model to Assess Rainfall-Triggered Shallow Landslides,” *Geotechnical and Geological Engineering*, vol. 41, pp. 2797–2814, July 2023.
- [3] E. A. Montoya-Araque, A. Aparicio-Ortubé, D. G. Zapata-Medina, and L. G. Arboleda-Monsalve, “An open-source application software to determine the preconsolidation pressure of soils in incremental loading oedometer testing: pySigmaP,” *SoftwareX*, vol. 17, p. 100990, Jan. 2022. Publisher: Elsevier B.V.
- [4] A. Ariza-Triana, E. A. Montoya-Araque, and L. O. Suarez-Burgoa, “Modeling of Bimrock/Bimsoil Structures by Means of Circular Particles Packed in R2,” in *Lecture Notes in Civil Engineering* (M. Barla, A. Di Donna, and D. Sterpi, eds.), vol. 126, pp. 737–743, Cham: Springer International Publishing, 2021. ISSN: 23662565.
- [5] E. A. Montoya-Araque, L. O. Suarez-Burgoa, and E. W. Medley, “Application of the tortuous surface method to stochastic analysis of bimslope stability,” *Bulletin of Engineering Geology and the Environment*, vol. 79, pp. 5329–5340, Dec. 2020. Publisher: Bulletin of Engineering Geology and the Environment.
- [6] E. A. Montoya-Araque and L. O. Suarez-Burgoa, “Evaluación de estabilidad de taludes compuestos por bimsoils/bimrocks mediante modelación computacional de superficies de falla tortuosas con el algoritmo A*,” in *Memorias del XVI Congreso Panamericano de Mecánica de Suelos e Ingeniería Geotécnica – Geotechnical Engineering in the XXI Century: Lessons learned and future challenges*, (Cancún, México), pp. 628–636, 2019.
- [7] L. O. Suarez-Burgoa, A. Ariza-Triana, and E. Montoya-Araque, “Modelamiento de estructuras de bimsoils mediante el empaquetado de partículas circulares en R2,” *Revista de la Facultad de Ciencias*, vol. 8, pp. 115–137, July 2019. Publisher: Universidad Nacional de Colombia.
- [8] E. A. Montoya-Araque and L. O. Suarez-Burgoa, “Automatic generation of tortuous failure surfaces in block-in-matrix materials for 2D slope stability assessments,” *Computers and Geotechnics*, vol. 112, pp. 17–22, Aug. 2019.
- [9] E. A. Montoya-Araque and L. O. Suarez-Burgoa, “pyBIMstab: Application software for 2D slope stability analysis of block-in-matrix and homogeneous materials,” *SoftwareX*, vol. 7, pp. 383–387, Jan. 2018.
- [10] E. A. Montoya-Araque and L. O. Suarez-Burgoa, “Software de aplicación en Python 3 para el cálculo de la estadística de tensores de segundo orden de Jelinek en datos de anisotropía de susceptibilidad magnética,” *Boletín de Ciencias de la Tierra*, no. 44, pp. 49–58, 2018.
- [11] L. O. Suarez-Burgoa and E. A. Montoya-Araque, “Programa en código abierto para el análisis bidimensional de estabilidad de taludes por el método de equilibrio límite,” *Revista de la Facultad de Ciencias*, vol. 5, pp. 88–104, July 2016.

Software development

pyNewmarkDisp Application software for spatial calculation of permanent displacements due to ground motion based on Newmark’s sliding block method. ©2022, Exneyder A. Montoya-Araque, Silvana Montoya-Noguera, Fernando López-Caballero & Universidad EAFIT.

- pySigmaP Application software for calculating the preconsolidation pressure of soils in incremental loading (IL) oedometer testing by several methods. ©2020, Exneyder A. Montoya-Araque, Alan J. Aparicio-Ortubé, David G. Zapata-Medina, Luis G. Arboleda-Monsalve & UNAL.
- pyBIMstab Application software to evaluate the factor of safety against sliding of slopes made of Blocks-In-Matrix (BIM) materials along tortuous surfaces. ©2018, Exneyder A. Montoya-Araque, Ludger Suárez-Burgoa & UNAL.
- jelinekstat Application software in Python 3 to apply the Jelínek's (1978) statistical model for a sample of n 2nd-order tensors. ©2018, Exneyder A. Montoya-Araque, Ludger Suárez-Burgoa & UNAL.
- pyCSS Circular Slope Stability pyProgram: 2D slope stability analysis by the limit equilibrium method using the Fellenius and Bishop methods. ©2016, Ludger Suárez-Burgoa, Exneyder A. Montoya Araque & UNAL.

Academic events

- Sept. 14th – 18th, 2022 **Lecture**, *XVII Geotechnical Engineering Colombian Congress - XVIICCG*, Cartagena
Desarrollo computacional para la evaluación espacial de desplazamientos permanentes debidos a eventos sísmicos – **Authors:** E. A. Montoya-Araque (Lecturer), S. Montoya-Noguera y F. Lopez-Caballero
- Sept. 15th – 23rd, 2018 **Lecture**, *AEG 61st Annual Meeting / IAEG XIII Congress*, San Francisco (EEUU)
Automatic Generation of Tortuous Failure Surfaces in Bimsoils to Evaluate the Stability of 2D Slopes – **Authors:** E. A. Montoya-Araque and L. O. Suarez-Burgoa (Lecturer)
- Aug. 14th – 19th, 2018 **Lecture**, *XIII Technical Week of Geology, Geological Eng. and Geosciences*, Manizales
Evaluación de estabilidad de taludes compuestos por bimsoils mediante modelación computacional de superficies de falla tortuosas – **Authors:** E. A. Montoya-Araque (Lecturer) and L. O. Suarez-Burgoa
- Aug. 9th – 14th, 2016 **Poster**, *XII Technical Week of Geology and Geological Engineering*, Medellín
Circular Slope Stability pyProgram (PyCSS): Programa de código abierto en Python para el análisis de estabilidad de taludes en 2D, métodos Fellenius y de Bishop. – **Authors:** L. O. Suarez-Burgoa and E. A. Montoya-Araque (Speaker)
- Aug. 31st – Sep. 5th, 2015 **Poster**, *XV Colombian Geology Congress*, Bucaramanga
Renovación de la sala de exhibición del Museo de Geociencias de la Facultad de Minas, Universidad Nacional de Colombia – **Authors:** M. Weber (Speaker), C. de Santis, N. Acevedo, L. Arce, J. Barón, A.C. Chica, E. García, N. Gómez, G. Guevara, E. Montoya, , G. Morales, J. E. Otálvaro, L. Patiño, J.O. Pérez, Y. Rodríguez

References

- At academy **Daniel Felipe Ruiz**, Phd., Msc., Civil Eng., Assistant Professor at School of Applied Sciences and Engineering, Universidad EAFIT, Colombia., dfruizr@eafit.edu.co
- Marion Weber Scharff**, Phd., Geologist, Assistant Professor at Geoscience and Environmental Department, Facultad de Minas, Universidad Nacional de Colombia., mweber@unal.edu.co
- Lúdrger O. Suárez-Burgoa**, Phd., Msc., Civil Eng., Associate Professor at Civil Engineering Department, Facultad de Minas, Universidad Nacional de Colombia, losuarezb@unal.edu.co
- At industry **Gonzalo Betancur Betancourt**, Msc., Civil Eng., Projects Director at INTEINSA., gonzalo.betancur@inteinsa.com

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