

Alba Yerro-Colom

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Google Scholar | 2477 citations, h-index= 22, i10-index=35

Research Interests

My research lies at the intersection of geotechnical engineering, computational mechanics, and natural hazard analysis. I specialize in the numerical modeling of large-deformation soil behavior using advanced particle-based methods, particularly the Material Point Method. My work focuses on understanding failure initiation, progressive failure, and post-failure dynamics of geotechnical systems, including landslides, slopes, tailings storage facilities, and soil–structure interaction problems. I place particular emphasis on coupled hydro-mechanical processes in saturated and unsaturated soils, vegetation and climate effects, and the development of robust numerical frameworks for hazard prediction and risk-informed engineering design.

Education

PHD IN GEOTECHNICAL ENGINEERING | 2015 | UNIVERSITAT POLITECNICA DE CATALUNYA (SPAIN)

- Title: Modelling of landslides in brittle and unsaturated soils
- Supervisors: Prof. Eduardo Alonso and Dr. Núria Pinyol
- Qualification: Excellent Cum Laude
- Pre-doctoral Research Grant (FPI) provided by the Spanish Ministry of Science and Innovation (competitive national funding) (2009-2014)

DEGREE IN CIVIL ENGINEERING (BSC & MSC) | 2009 | UNIVERSITAT POLITECNICA DE CATALUNYA (SPAIN)

- MSc Thesis with honors
- Title: Superficial movement analysis of the area of Súria by means of Differential Radar Interferometry
- Supervisors: Prof. Jordi Corominas and Prof. Jordi Mallorquí
- Scholarship provided by the Spanish Ministry of Social Education and Sports

Work Experience

ASSOCIATE PROFESSOR | VIRGINIA TECH (USA) | AUG 2024 - PRESENT

- Research, Teaching, and Service
- Numerical methods in geotechnical engineering; Material Point Method; Large deformations of soils; Slope stability; Failure initiation and run-out prediction; Soil-water-structure interaction

VISITING FACULTY | UNIVERSITAT POLITECNICA DE CATALUNYA (SPAIN) | SEP 2025 – JUNE 2026

- International collaboration on a European Project
- Stability optimization of tailing dumps and open pit slopes using numerical tools.

ASSISTANT PROFESSOR | VIRGINIA TECH (USA) | AUG 2017 – JUL 2024

- Research, Teaching, and Service
- Numerical methods in geotechnical engineering; Material Point Method; Large deformations of soils; Slope stability; Failure initiation and run-out prediction; Soil-water-structure interaction

POSTDOCTORAL FELLOW | UNIVERSITY OF CAMBRIDGE (UK) | DEC 2015 – MAY 2017

- Modelling internal erosion processes due to soil–water interaction with the Material Point Method. Post-doctoral Marie Curie Grant (NM06208)

RESEARCH ASSISTANT | INTERNATIONAL CENTRE FOR NUMERICAL METHODS IN ENGINEERING (SPAIN) | JAN 2015 – NOV 2015

- Landslide modelling in brittle materials with the Material Point Method (MPM)
- Modeling of the Aznalcollar tailings dam failure

PHD VISITING SCHOLAR | DELTARES (THE NETHERLANDS) | FEB 2011 - OCT 2011

- First collaboration between UPC and Deltares regarding a common MPM code development (Supervisor: Prof. Pieter Vermeer)

RESEARCH ASSISTANT | UNIVERSITAT POLITECNICA DE CATALUNYA (SPAIN) | SEP 2008 – SEP 2015

- Landslide modelling in brittle materials with the Material Point Method (MPM). Development of dynamic coupled hydro-mechanical MPM codes. Extension of MPM formulation to unsaturated conditions. Elastoplastic constitutive modelling, Site characterisation and hydrological modelling of the Landslide of Vallcebre. Age dating groundwater with radioactive isotopes

CONSTRUCTION MANAGER ASSISTANT | COTS I CLARET, CIVIL ENGINEERING COMPANY (SPAIN) | JUN 2007 – SEP 2007

- Construction management of civil engineering projects.

Research Honors & Awards

NSF CAREER AWARD 2024

- Awarded by the National Science Foundation to support early-career faculty who demonstrate the potential to serve as academic role models and to lead advances in research and education. The award supports a five-year integrated research and education program on Transformative Understanding of Rainfall-Triggered Landslides with Vegetation Effects under Climate Change (Award #2340657).
- *Competitiveness*: Extremely competitive; NSF CAREER awards are among the most prestigious early-career honors in the United States.

TELFORD GOLD MEDAL 2015

- Awarded by the Institution of Civil Engineers for the paper “The material point method for unsaturated soils” published in Géotechnique, recognizing exceptional originality, rigor, and impact on civil engineering knowledge and practice.
- *Competitiveness*: Extremely selective; the Telford Gold Medal is the ICE’s highest technical paper honor, awarded to one paper annually across all civil engineering disciplines.

USUCGER EARLY CAREER RESEARCHER AWARD 2023

- Awarded by the United States Universities Council on Geotechnical Education and Research, a national organization representing U.S. academic geotechnical engineering programs, in recognition of outstanding research contributions and promise by an early-career faculty member.
- *Competitiveness*: Highly selective; awarded annually to two early-career researchers nationwide, based on scholarly impact and research leadership within the geotechnical engineering community..

EXTRAORDINARY PH.D. AWARD 2015

- Awarded by the Universitat Politècnica de Catalunya to recognize doctoral dissertations of exceptional quality, originality, and scholarly contribution.
- *Competitiveness*: Highly selective; typically awarded to only a small fraction of Ph.D. graduates within the university in a given year.

DIPLOMA OF ADVANCED STUDIES, QUALIFIED WITH HONORS

- Awarded by the Universitat Politècnica de Catalunya. Awarded for outstanding academic performance in advanced graduate-level coursework preceding doctoral studies.
- *Competitiveness*: Selective; honors designation reflects top-tier academic performance relative to peers.

MINOR THESIS, QUALIFIED WITH HONORS

- Awarded by the Universitat Politècnica de Catalunya. Recognition for excellence in an undergraduate or pre-graduate research thesis.
- *Competitiveness*: Moderately selective; honors designation indicates performance well above degree requirements.

JOURNAL PAPER AWARDS - EDITOR'S CHOICE COLLECTION

- Two papers were selected for inclusion in the Editor's Choice Collection by the editors of the ASCE Journal of Geotechnical and Geoenvironmental Engineering, highlighting publications judged to be of exceptional interest, novelty, quality, and relevance to the geotechnical engineering community:
    1. Yost, K., Yerro, A., Green, R., Martin, E., Cooper, J. (2022). MPM modeling of cone penetrometer testing for multiple thin-layer effects in complex soil stratigraphy.
    2. Macedo, J., Yerro, A., Cornejo, R., Pierce, I., Cadia (2024). TSF Failure Assessment considering Triggering and Post-Triggering Mechanisms.
- *Competitiveness*: Selective editorial distinction; only around 12 of the published papers are chosen annually for Editor's Choice from the journal's total output.

Teaching Honors & Awards

G.V. LOGANATHAN FACULTY ACHIEVEMENT AWARD 2024

- Awarded by the Department of Civil and Environmental Engineering, Virginia Tech in recognition of outstanding faculty mentorship and commitment to student development.
- *Competitiveness*: Selective at the departmental level; typically awarded to one faculty member per year based on demonstrated excellence in mentoring, advising, and student support..

NOMINATED FOR THE 2022 COLLEGE OF ENGINEERING OUTSTANDING FACULTY MENTOR

- Nominated by students and chosen by the CEE Graduate Committee to represent CEE in the College of Engineering Outstanding Faculty Mentor 2022 award process at Virginia Tech (finally not awarded at the College level).

INVITED PANELIST ON MENTORING GRADUATE STUDENTS

- Invited panelist in a session for new faculty within the College of Engineering at Virginia Tech on "Mentoring Graduate Students" organized by Holly M. Matusovich, Associate Dean of Graduate and Professional Studies (10-14-2022).

Memberships

- **Founding member and core software developer** of the Anura3D MPM Research Community (2011-present). This community is an international consortium of researchers that collaboratively develops, maintains, and validates the Anura3D software for large-deformation geotechnical applications. The community promotes open scientific exchange, code verification and benchmarking, and the advancement of MPM theory and practice through shared research, workshops, and training.
- Regular Member of the Tailings and IndustriaL waste Engineering Center center (Dec 2020 – present).
- Honorary Research Fellow of the University of Birmingham, UK. (August 2019 – present)
- Member of the American Society of Civil Engineering (ASCE) (February 2019 –present)
- Member of the Geo-Institute (GI), American Society of Civil Engineering (February 2019 – present)
- Member of the Computational Geotechnics Technical Committee – G.I.– ASCE (Nov 2020 – present)
- Member of the Embankments, Dams, and Slopes Technical Committee – GI.– ASCE (Oct 2020 – present)
- Member of the Continuing Education Program Committee – G.I.– ASCE (March 2025 – present)
- Member of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) (June 2020 – present)
- Member of the Geo-Mechanics from Micro to Macro Technical Committee (TC102) – ISSMGE (January 2021 – present)
- Member of the U.S. Association for Computational Mechanics (May 2021-present)
- SCR-Associate at Churchill College, Cambridge, UK – (2015-2017)

CENTER FOR GEOTECHNICAL PRACTICE AND RESEARCH (CGPR) AT VIRGINIA TECH

Contributing by leading research projects:

- (2021-2023) Estimating the effectiveness of stone columns in mitigating post-liquefaction settlement – PIs: Yerro A. and Rodriguez-Marek A.; Student: Roisha Maharjan.
- (2023-2024) Use of vertical barriers to reduce the settlement impacts on adjacent structures – PIs: Yerro A. and Hosseini R.; Student: Sukrityranjan Samanta.

Publications

* signifies current or former student, underline who made the presentation

INDEXED JOURNAL PAPERS

1. *Alsardi A, **Yerro A**, Long CC. (2026) Assessment of the hydromechanical higher-order MPM for the simulation of geotechnical problems. Computational Particle Mechanics 14, 73-95. https://doi.org/10.1016/j.cpms.2026.01.007
2. *Li R, Leung AK, Zhu J, **Yerro A**, Jiang Z (2026) A new interpretation method for matric suction correction to cone penetration test results in unsaturated sand. Canadian Geotechnical Journal. https://doi.org/10.1139/cgj-2025-0207
3. *Alsardi A, **Yerro A**, Long CC. (2026) Enhanced MPM framework with multipatch isogeometric analysis for geotechnical applications. Computers and Geotechnics 190, 107743. https://doi.org/10.1016/j.compgeo.2025.107743
4. *Samanta S, Hosseini R, **Yerro A** (2026) Controlling Settlement Due to Adjacent Loading Using Sheet-Pile Walls: Insights from Finite Element Analysis. Geotechnical and Geological Engineering 44, 44. https://doi.org/10.1007/s10706-025-03564-7
5. *Roshan AR, **Yerro A** (2025) Connecting landslide basal sliding surface characteristics with post-failure kinematics and impact on rigid structures: An MPM numerical study. Computers and Geotechnics, 182, 107158. https://doi.org/10.1016/j.compgeo.2025.107158
6. *Swamy VS, **Yerro A**, Sandu C, Pandit R, Gorsich D, Sebeck K. (2025) Numerical analysis of tire mobility on deformable plastic clay in saturated conditions using total and effective stress frameworks. Journal of Terramechanics, 117, 101024. https://doi.org/10.1016/j.jterra.2024.101024
7. *Zambrano-Cruzatty L, **Yerro A**, Charbonneau BR, Stark N. (2024) A soil mechanics model to determine the onset of wind erosion. Coastal Engineering, 191, 104523. https://doi.org/10.1016/j.coastaleng.2024.104523
8. *Urmi ZA, **Yerro A**, Saeidi A, Chavali RVP. (2024) Prediction of retrogressive landslide in sensitive clays by incorporating a novel strain softening law into the Material Point Method. Engineering Geology, 340 107669. https://doi.org/10.1016/j.enggeo.2024.107669
9. Ceccato F, **Yerro A**, Di Carluccio G. (2024) Simulating landslides with the material point method: Best practices, potentialities, and challenges. Engineering Geology, 107614. https://doi.org/10.1016/j.enggeo.2024.107614
10. *Lu M, Ceccato F, Zhou M, **Yerro A**, Zhang J. (2024) Evaluating the exceedance probability of the runout distance of rainfall-induced landslides using a two-stage FEM-MPM approach. Acta Geotechnica, 19 (6), 3691-3706. https://doi.org/10.1007/s11440-023-02160-4
11. Macedo J, **Yerro A**, *Cornejo R, *Pierce I. (2024) Cadia TSF failure assessment considering triggering and post-triggering mechanisms. Journal of Geotechnical and Geoenvironmental Engineering, 150 (4), 04024011. https://doi.org/10.1061/JGGEFK.GTENG-11660
12. *Yost KM, **Yerro A**, Martin ER, Green RA. (2024) A cone penetration test database for multiple thin-layer correction procedure development. Earthquake Spectra, 40 (1), 803-827. https://doi.org/10.1177/87552930231217002
13. *Swamy VS, *Pandit R, **Yerro A**, Sandu C, Rizzo DM, Sebeck K, Gorsich D (2023) Review of Modeling and Validation Techniques for Tire-Deformable Soil Interactions. Journal of Terramechanics 109, 73-92. https://doi.org/10.1016/j.jterra.2023.05.007
14. *Monzer A, Faramarzi A, **Yerro A**, Chapman D (2023) MPM Investigation of the Fluidization Initiation and Postfluidization Mechanism around a Pressurized Leaking Pipe. Journal of Geotechnical and Geoenvironmental Engineering, 149(11), 04023096. https://doi.org/10.1061/JGGEFK.GTENG-10985

15. *Urmi ZA, Saeidi A, **Yerro A**, *Chavali RVP. (2023) Prediction of post-peak stress-strain behavior for sensitive clays. Engineering Geology, 323, 107221. https://doi.org/10.1016/j.enggeo.2023.107221
16. *Urmi ZA, Saeidi A, Chavali RVP, **Yerro A**. (2023) Failure mechanisms, existing constitutive models and numerical modeling of landslides in sensitive clay: A review. Geoenvironmental Disasters, 10(1), 1-28. https://doi.org/10.1186/s40677-023-00242-9
17. *Yost K, Martinelli M, **Yerro A**, Green R, de Lange D. (2023) Addressing Complexities in MPM Modeling of Calibration Chamber Cone Penetrometer Tests in Homogenous and Highly Interlayered Soils. Computers and Geotechnics, 158, 105378. https://doi.org/10.1016/j.compgeo.2023.105378
18. Zalachoris G, Zekkos D, **Yerro A**, Bowers A, Wissmann KJ. (2023) 3D Numerical Assessment of Rammed Aggregate Pier Performance under Dynamic Loading in Liquefiable Soils. Journal of Geotechnical and Geoenvironmental Engineering, 149(3), 04023001. https://doi.org/10.1061/JGGEFK.GTENG-10795
19. *Girardi V, **Yerro A**, Simonini P, Gabrieli F, Ceccato F. (2023) Wetting induced instabilities in layered slopes: A Material Point Method analysis. Engineering Geology, 106978. https://doi.org/10.1016/j.enggeo.2022.106978
20. *Alsardi A, **Yerro A**. (2023) Coseismic site response and slope instability using periodic boundary conditions in MPM. Journal of Rock Mechanics and Geotechnical Engineering, 15(3), 641-658. https://doi.org/10.1016/j.jrmge.2022.09.016
21. *Zambrano-Cruzatty L, **Yerro A**, Macedo J. (2022) Constitutive modelling of non-cohesive soils under high-strain rates: a consistency approach. Géotechnique, 74(8), 743-760. https://doi.org/10.1680/jgeot.21.00192
22. **Yerro A**, *Girardi V, Martinelli M, Ceccato F. (2022) Modelling unsaturated soils with the Material Point Method. A discussion of the state-of-the-art. Geomechanics for Energy and the Environment, 32, 100343. https://doi.org/10.1016/j.gete.2022.100343
23. *Yost K, **Yerro A**, Green R, Martin E, *Cooper J. (2022) MPM Modeling of Cone Penetrometer Testing for Multiple Thin-Layer Effects in Complex Soil Stratigraphy. Journal of Geotechnical and Geoenvironmental Engineering, 148:04021189. https://doi.org/10.1061/(ASCE)GT.1943-5606.0002730
24. *Thum TS, **Yerro A**, *Saade A, *Ye E, Wissmann KW, Green RA. (2022) Numerical modeling of Rammed Aggregate Piers (RAP) in liquefiable soils. Soil Dynamics and Earthquake Engineering, 153:107088. https://doi.org/10.1016/j.soildyn.2021.107088
25. *Cooper J, Martin ER, *Yost KM, **Yerro A**, Green RA. (2021) Robust identification and characterization of thin soil layers in cone penetration data by piecewise layer optimization. Computers and Geotechnics, 141:104404. https://doi.org/10.1016/j.compgeo.2021.104404
26. *Alsardi A, *Copana J, **Yerro A**. (2021) Modelling earthquake-triggered landslide runout with the Material Point Method. Proceedings of the Institution of Civil Engineers - Geotechnical Engineering, 174(5):563-576. https://doi.org/10.1680/jgeen.20.00235
27. *Girardi V, **Yerro A**, Ceccato F, Simonini P. (2021) Modeling large deformations in water retention structures with an unsaturated MPM approach. Proceedings of the Institution of Civil Engineers - Geotechnical Engineering, 174(5):577-592. https://doi.org/10.1680/jgeen.21.00059
28. *Yost K, Green R, Upadhyaya S, Mauer BW, **Yerro A**, Martin ER, *Cooper J. (2021) Assessment of the Efficacies of Correction Procedures for Multiple Thin Layer Effects on Cone Penetration Tests. Soil Dynamics and Earthquake Engineering, 144:106677. https://doi.org/10.1016/j.soildyn.2021.106677

29. Alonso E, Pinyol N, **Yerro, A**. (2021) Dynamics of landslides in argillaceous rocks. Geotecnia, 152:273-305. https://doi.org/10.14195/2184-8394_152_8
30. Ceccato F, **Yerro A**, *Girardi V, Simonini P. (2021) Two-phase dynamic MPM formulation for unsaturated soil. Computers and Geotechnics, 129:103876. https://doi.org/10.1016/j.compgeo.2020.103876
31. *Zambrano-Cruzatty L, **Yerro A.** (2020) Numerical Simulation of a Free Fall Penetrometer Deployment Using the Material Point Method, Soils and Foundations, 60(3):668-682. https://doi.org/10.1016/j.sandf.2020.04.002
32. **Yerro A**, Soga K, Bray J (2019) Runout evaluation of the Oso Landslide with the Material Point Method, Canadian Geotechnical Journal, 56(9):1304-1317. https://doi.org/10.1139/cgj-2017-0630
33. **Yerro A**, Alonso E, Pinyol N. (2016) Run-out of landslides in brittle soils. Computers and Geotechnics, 80: 427-439. https://doi.org/10.1016/j.compgeo.2016.03.001
34. **Yerro A**, Pinyol N, Alonso E. (2016) Internal progressive failure in deep seated landslides. Rock Mechanics and Rock Engineering, 49(6):2317-2332. https://doi.org/10.1007/s00603-015-0888-6
35. Soga K, Alonso E, **Yerro A**, Kumar K, Bandara S. (2016) Trends in large-deformation analysis of landslide mass movements with particular emphasis on the material point method. Géotechnique, 66(3): 248-273. https://doi.org/10.1680/jgeot.15.LM.005
36. **Yerro A**, Alonso E, Pinyol N. (2015) The material point method for unsaturated soils. Géotechnique, 65(3): 201-217. https://doi.org/10.1680/geot.14.P.163
37. Alonso EE, Pinyol NM, **Yerro A**. (2014) Mathematical modelling of slopes. Procedia Earth and Planetary Science, 9: 64-73. https://doi.org/10.1016/j.proeps.2014.06.002
38. **Yerro A**, Corominas J, Monells D, Mallorquí JJ. (2014) Analysis of the evolution of ground movements in a low densely urban area by means of DInSAR technique. Engineering Geology, 170: 52-65. https://doi.org/10.1016/j.enggeo.2013.12.002

PEER-REVIEWED CONFERENCE PAPERS

1. *Samanta S, **Yerro A**, Dhakal S. (2025) A Data-Driven Approach to Predicting the Stability of Root-Reinforced Slopes under Extreme Rainfall Conditions. In: Proc. Geo-Extreme 2025, Long Beach, California, November 2–5, 2025. https://doi.org/10.1061/9780784486498.019
2. *Karam C, **Yerro A**, Westcott J. (2025) Numerical study of trapdoor underground collapses using material point method. In: Proc. Geotechnical Frontiers 2025, Louisville, KY, USA, March 2-5, 2025. https://doi.org/10.1061/9780784485989.018
3. *Samanta S, **Yerro A**, Hosseini R. (2025) A numerical study on the effectiveness of driven sheet-pile walls as barriers to reduce settlement in preexisting structures due to adjacent loading. In: Proc. Geotechnical Frontiers 2025, Louisville, KY, USA, March 2-5, 2025. https://doi.org/10.1061/9780784485965.01
4. *Swamy VS, *Mason D, **Yerro A**, Sandu C, Sebeck K, Gorsich D. (2024) Numerical evaluation of the influence of terrain properties in clay-tire interactions. In: Proc. International Congress of Automotive and Transport Engineering (EAEC-CONAT 2024), Brasov, Romania, November 6-8, 2024. https://doi.org/10.1007/978-3-031-77627-4_30
5. *Mason D, *Swamy BS, Sandu C, **Yerro A**, Sebeck K, Gorsich D. (2024) Assessing sensitivities of off-road pneumatic tire on clay: A finite element investigation on tire operational and design factors. In: Proc. 21st International and 12th Asia-Pacific Regional Conference of the ISTVS, Yokohama, Japan, October 28-31, 2024. https://doi.org/10.56884/0AXMP2K2

6. *Bheora JK., *Swamy BS, *Mason D, **Yerro A**, Sandu C, Castellanos B, Sebeck K, Gorsich D. (2024) The role of tire-soil interface characteristics on performance parameters through experimental and numerical investigation. In: Proc. 21st International and 12th Asia-Pacific Regional Conference of the ISTVS, Yokohama, Japan, October 28-31, 2024. https://doi.org/10.56884/X7EXV5XW
7. *Urmi ZA, Saeidi A, Chavali RVP, **Yerro A**. (2024) Numerical simulation of the Lemieux Landslide of June 20, 1993, South Nation Valley with material point method. In: Proc. 77th Canadian Geotechnical Conference (Geo-Montreal 2024), Montreal, Canada, September 15-18, 2024.
8. *Li R, Leung AK, **Yerro A**, Yu C, Jiang Z. (2024) A review of laboratory cone penetration test (CPT) in unsaturated soil. In: Proc. 7th International Conference on Geotechnical and Geophysical Site Characterization, Barcelona, Spain, June 18 – 21, 2024. https://www.scipedia.com/public/Li*_et_al_2024a
9. *Yost KM, Green RA, **Yerro A**, Martin ER. (2024) Utilizing CPT databases to better inform liquefaction evaluations. In: Proc. 18th World Conference on Earthquake Engineering, Milan, Italy, June 30-July 5, 2024.
10. *Alsardi A, **Yerro A.** (2024) MPM Coseismic Slope Runout Prediction Using the Intergranular Strain Anisotropy Hypoplastic Model. In: Proc. Geo-Congress 2024, Vancouver, Canada, February 25-28, 2024. https://doi.org/10.1061/9780784485347.021
11. *Urmi ZA, Saeidi A, **Yerro A**, Chavali RVP. (2024) Implementation of a new strain softening constitutive model in the Material Point Method for the simulation of retrogressive failure in sensitive clays. In: Proc. Geo-Congress 2024, Vancouver, Canada, February 25-28, 2024. https://doi.org/10.1061/9780784485347.02
12. *Roshan A, **Yerro A**. (2024) Effects of Slope Geometry on the Impact Forces on Retaining Structures due to Compound Landslides. In: Proc. Geo-Congress 2024, Vancouver, Canada, February 25-28, 2024. https://doi.org/10.1061/9780784485347.023
13. *Swamy V, *Pandit R, **Yerro A**, Sandu C, Rizzo DM, Sebeck K, Gorsich D. (2024) Numerical modeling of a tire on undrained saturated clay using FEM, ALE, and SPH. In: Proc. 16th European-African Regional Conference of the ISTVS, Lublin, Poland, October 11-13, 2023. https://doi.org/10.56884/TWIL1196
14. *Monzer A, Faramarzi A, **Yerro A**, Chapman DN. (2023) Influence of leakage direction and pipe depth on the soil fluidisation using the MPM. In: Proc. 10th European Conference on Numerical Methods in Geotechnical Engineering, Zdravković L, Konte S, Taborda DMG, Tsiampousi A (eds). London, UK, June 26-28, 2023. https://doi.org/10.53243/NUMGE2023-50
15. *Urmi ZA , Chavali RVP, Saeidi A, **Yerro A**. (2023) Effect of strain softening on the prediction of post-failure runout in sensitive clay landslide. In: Proc. 10th European Conference on Numerical Methods in Geotechnical Engineering, Zdravković L, Konte S, Taborda DMG, Tsiampousi A (eds). London, UK, June 26-28, 2023. https://doi.org/10.53243/NUMGE2023-369
16. *Furkan Yalcin F, *Zambrano-Cruzatty L, **Yerro A**. (2023) Numerical Analysis of FFP Impact on Saturated Sands. In: Proc. Geo-Congress 2023. Los Angeles, CA, U.S., March 27-29, 2023. https://doi.org/10.1061/9780784484692.01
17. *Zambrano-Cruzatty L, **Yerro A**, Charbonneau B. (2023) A Simplified Model for Predicting Wind Erosion of Moistened Sands. In: Proc. Geo-Congress 2023. Los Angeles, CA, U.S., March 27-29, 2023. https://doi.org/10.1061/9780784484654.042
18. Cornejo R, Macedo J, Olson SM, **Yerro A**. (2022) Geometrical Considerations on the Runout Analysis of the Fundão Dam Failure Dams. In: Proc. Tailings and Mine Waste 2022. November 6-9, 2022, Denver, Colorado, US. https://drive.google.com/file/d/1CKjgcsXtS1stlbXlCKnB8TU5Bp4LSkCU/view

19. *Swamy VS, *Pandit R, **Yerro A**, Sandu C, Castellanos B, Rizzo D, Sebeck K. (2023) Behavior of wet clay due to off-road traffic loading. In: Proc. 17th European Automotive Congress, Pp. 1-8. Timişoara, Romania, October 26-28, 2022. https://doi.org/10.1088/1757-899X/1311/1/012021
20. *Girardi V, Ceccato F, **Yerro A**, Simonini P, Gabrieli F. (2022) Large strain analysis of unsaturated heterogeneous slopes with MPM. Challenges and Innovations in Geomechanics: Proceedings of the 16th International Conference of IACMAG-Volume 3, pp. 229-236. Torino, Italy, August 30 – September 2, 2022. https://doi.org/10.1007/978-3-031-12851-6_28
21. *Urmi ZA, *Chavali RVP, Saeidi A, **Yerro A**. (2022) Analytical and numerical assessment of the effect of erosion in sensitive clay landslide: A case study of Saint-Jude Landslide. In: Proc. Geo Calgary. Banff, Canada, September 29 – October 1, 2022.
22. *Swamy VS, *Pandit R, **Yerro A**, Sandu C, Rizzo DM, Sebeck K. (2022). A review of modeling and validation techniques for tire-deformable soil interactions. In: Proc. 11th Asia-Pacific Regional Conference of the International Society for Terrain-Vehicle Systems. September 26-28, 2022, Harbin, China. https:/doi.org/10.56884/IKFA4933
23. *Girardi V, Ceccato F, **Yerro A**, Simonini P, Gabrieli F. (2022) Large strain analisis of unsaturated heterogeneous slopes with MPM. In: Proc. 16th International Conference of International Association for Computer Methods and Advances in Geomechanics. Torino, Italy, August 30 - September2, 2022. https://doi.org/10.1007/978-3-031-12851-6_28
24. *Nissar N, **Yerro A**. (2022) Internal shearing in compound landslides and consequences on structure interaction. In: Proc. 3rd International Conference on Natural Hazards and Infrastructure, Athens, Greece, July 5-7, 2022.
25. *Alsardi A, **Yerro A**. (2022) Comparison of the material point method with one-dimensional site response solution. In: 12th National Conference on Earthquake Engineering. Salt Lake City, UT, U.S., June 27-July1, 2022.
26. *Yost K, **Yerro A**, Green R, Martin E. (2022) Harnessing Numerical Tools to Study the Limitations of CPTs in Characterizing Complex Soil Stratigraphy for Liquefaction Assessment. In: 12th National Conference on Earthquake Engineering. Salt Lake City, UT, U.S., June 27-July1, 2022. https://par.nsf.gov/biblio/10392535
27. *Urmi ZA, Chavali RVP, Saeidi A, **Yerro A**. (2022) Prediction of remolded shear strain for eastern Canadian sensitive clays. In: Proc. 8th Canadian Conference on Geotechnique and Natural Hazards, Quebec City, Canada, June 12-15, 2022.
28. *Yost KM, *Cooper J, Green RA, Martin ER, **Yerro A**. (2022). Correcting measured CPT tip resistance for multiple thin-layer effects. In: Proc. 5th International Symposium on Cone Penetration Testing. Bologna, Italy, June 8-10, 2022. Proceedings
29. **Yerro A**, *Murphy J, Soga K. (2022) Evaluation of the Material Point Method for the modeling of suffusion processes. In: Proc. 20th International Conference on Soil Mechanics and Geotechnical Engineering. Sydney, Australia, May 1-6, 2022. Proceedings
30. *Copana J, **Yerro A**, Rodriguez-Marek A. (2022) Comparison Study of Methods to Assess a Rigid Slope Seismic Stability. In: Proc. Geo-Congress 2022. Charlotte, NC, U.S., March 20-23, 2022. https://doi.org/10.1061/9780784484043.0
31. *Monzer A, *Murphy J, **Yerro A**, Faramarzi A, Chapman D. (2022) Simulation of Soil Fluidization Around a Pressurized Leaking Pipe Using the Material Point Method. In: Proc. Geo-Congress 2022. Charlotte, NC, U.S., March 20-23, 2022. https://doi.org/10.1061/9780784484050.038

32. **Yerro A**. (2022) The Material Point Method: an emerging tool for the simulation of large deformations and soil-water-structure interactions in geotechnical engineering. In: Proc. 70th Annual Geotechnical Engineering Conference. Minneapolis, MN, U.S., 17 February 18, 2022.
33. Ceccato F, Chmelnizkij A, **Yerro A**, Martinelli M. (2021). MPM developments in soil-water-structure interaction implemented in Anura3D. In: Proc. VII International Conference on Particle-based Methods. Hamburg, Germany, October 4-6, 2021. https://www.scipedia.com/wd/images/0/0f/Draft_Content_926943756866_paper.pdf
34. *Alsardi A, **Yerro A.** (2021) Runout modeling of earthquake-triggered landslides with the Material Point Method. In: International Foundations Congress and Equipment Expo. Dallas, Texas, US, May 10-14, 2021. https://doi.org/10.1061/9780784483428.003
35. *Thum T S, **Yerro A**, Green R A, *Ye E, *Saade A, Wissmann K. (2021) Settlement Prediction of a RAP-supported Footing in Liquefiable Soils Subjected to a Seismic Loading. In: International Foundations Congress and Equipment Expo. Dallas, Texas, US, May 10-14, 2021. https://doi.org/10.1061/9780784483411.041
36. *Xu X, **Yerro A**, Soga K, Li M, Jin F. (2021) Numerical Modelling and Simulation of the Wheel Rotation Problems by the Material Point Method. In: Barla M., Di Donna A., Sterpi D. (eds) Challenges and Innovations in Geomechanics. IACMAG 2021. Lecture Notes in Civil Engineering, vol 125. Springer, Cham. https://doi.org/10.1007/978-3-030-64514-4_87
37. *Zambrano-Cruzatty L, **Yerro A**. (2020) Influence of the Stiffness and Saturated Conditions of Sand on the Numerical Simulation of Free Fall Penetrometers. In: Proc. Geo-Congress 2020, Minneapolis, Minnesota. https://doi.org/10.1061/9780784482803.002
38. *Murphy J, **Yerro A**, Soga K. (2020) New approach to simulate internal erosion with MPM. In: Proc. Geo-Congress 2020, Minneapolis, Minnesota. https://doi.org/10.1061/9780784482803.052
39. Ceccato F, *Girardi V, **Yerro A**, Simonini P. (2019) Evaluation of dynamic Explicit MPM Formulations for Unsaturated Soils. In: Proc. VI International Conference on Particle-Based Methods. Barcelona, Spain. https://www.research.unipd.it/bitstream/11577/3331995/1/Ceccato_et%20al_2019_fullPaper_07.pdf
40. *Zambrano-Cruzatty L, **Yerro A**, Stark N. (2019). Influence of shear strength and moisture content on aeolian surface erosion. In: Proc. Geo-Congress 2019. Philadelphia, Pennsylvania, US. https://doi.org/10.1061/9780784482155.00
41. *Zambrano-Cruzatty L, **Yerro A**, Stark N. (2019). Numerical modeling of a free fall penetrometer deployment using the material point method. In: Proc. Geo-Congress 2019. Philadelphia, Pennsylvania, US. https://doi.org/10.1061/9780784482124.013
42. *Zambrano-Cruzatty L, **Yerro A**. (2019) Numerical simulation of a free fall penetrometer deployment using the Material Point Method. In: Proc. International Conference on the Material Point Method. Cambridge, UK.
43. *Zambrano-Cruzatty L, Stark N, **Yerro A**. (2018) The effect of shear strength and moisture content on the fluid velocity threshold of wind erosion. In: Proc. 36th International Conference on Coastal Engineering, Baltimore, Maryland, US. https://icce-ojs-tamu.tdl.org/icce/article/view/8502
44. Ceccato F, **Yerro A**, Martinelli M. 2018. Modelling soil-water interaction with the Material Point Method. Evaluation of single-point and double-point formulations. In: Proc. NUMGE 2018 European Conference on Numerical Methods in Geotechnical Engineering, Porto, Portugal. Proceedings
45. **Yerro A**, Soga K, Bray J. (2017) Runout evaluation of the Oso, Washington Landslide with the Material Point Method. In: Proc. Workshop on Advances in Landslide Understanding, Barcelona, Spain.

46. **Yerro A**, Rohe A, Soga K. (2017) Modelling internal erosion with the Material Point Method. Proc. 1st International Conference on the Material Point Method. 10th -13th January, Delft, The Netherlands. https://doi.org/10.1016/j.proeng.2017.01.048
47. Parera F, Pinyol N, Alvarado M, **Yerro A**. (2017) Novel procedure to validate MPM results with PIV measurements. Proc. 1st International Conference on the Material Point Method. 10th-13th January, Delft, The Netherlands. https://doi.org/10.1016/j.proeng.2017.01.039
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50. **Yerro A**, Alonso E, Pinyol N. (2016) Modelling the initiation and run-out of rainfall-induced slope instability. In: Proc. 12th International symposium on Landslides. 12th-19th June, Naples, Italy. Proceedings
51. Alonso EE, **Yerro A**, Pinyol NM. (2015) Recent developments of the Material point Method for the simulation/prediction of landslides. Key note lecture. In: International Symposium on Geohazards and Geomechanics. 10th-11th September 2015, Warwick, UK. https://iopscience.iop.org/article/10.1088/1755-1315/26/1/012003/pdf
52. **Yerro A**, Alonso E, Pinyol N. (2014) Run-out of landslides in brittle soils. MPM analysis. In: K. Soga et al. (eds.), Geomechanics from micro to macro. London: Taylor & Francis, pp. 977-982. Researchgate
53. **Yerro A**, Alonso E, Pinyol N. (2014) Modelling progressive failure in MPM. In: Proc. 8th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE), Delft, The Netherlands. pp. 319-323. Proceedings
54. **Yerro A**, Alonso E, Pinyol N. (2013) The Material Point Method: a promising computational tool in Geotechnics. In: Proc.18th International Conference for Soil Mechanics and Geotechnical Engineering, Paris. Vol. 1, pp. 853-856. UPCommons
55. **Yerro A**. (2011) Solving hydro-mechanical problems with the material point method. In: Proc. 21st European Young Geotechnical Engineers' Conference, "Geotechnical Engineering: New Horizons", Rotterdam. pp. 318-323. UPCommons

OPEN-ACCESS DATASETS

1. *Samanta, S., **Yerro, A.**, *Dhakal, S. 2025. A dataset of roots and root-reinforced soil characteristics. DesignSafe-CI. https://doi.org/10.17603/ds2-b8rx-mq61

BOOK CHAPTERS

1. **Yerro A**, Rohe, A. (2019) Fundamentals of the Material Point Method. The Material Point Method for Geotechnical Engineering: A Practical Guide. Eds. J. Fern, A. Rohe, K. Soga, E.E. Alonso - CRC Press, London (2019): 23-56.
2. **Yerro A**, Alonso E. (2019) Landslides in Unsaturated Soil. The Material Point Method for Geotechnical Engineering: A Practical Guide. Eds. J. Fern, A. Rohe, K. Soga, E.E. Alonso - CRC Press, London (2019): 215-224.

ABSTRACTS OR EXTENDED ABSTRACTS

1. *Alsardi, A., **Yerro, A**., Long, C., 2025. Higher-order hydromechanical MPM framework. 9th International Conference on Particle-based Methods PARTICLES 2025, Barcelona, Spain, October 20-22, 2025
2. *****Karam, C., **Yerro, A**., Westcott, J., *Samanta, S., 2025. Numerical Simulation of Trapdoor Underground Collapses Using Anura3D. Anura3D Workshop, Barcelona, Spain, January 30-31, 2025.
3. *Moore, J., **Yerro, A**., 2025. First Step to Addressing Volumetric Locking in MPM Portable Free Fall Penetrometer Models J. Anura3D Workshop, Barcelona, Spain, January 30-31, 2025.
4. *Alsardi, A., **Yerro, A**., 2025. Mitigating volumetric locking in IGA MPM. Anura3D Workshop, Barcelona, Spain, January 30-31, 2025.
5. *Alsardi, A., **Yerro, A**., Long, C., 2025. Higher order MPM for simulating coseismic landslides. 18th U.S. National Congress on Computational Mechanics, Chicago, Illinois, United States, July 20-24, 2025.
6. *Samanta, S., *Tharakan, G., Hoppe, E., Koutromanos, I., **Yerro, A**., Jacques, E. 2025. Performance Evaluation of the Deepest Precast Box Culvert in the U.S.: Lessons from Poplar Creek, VA. Southeastern Transportation Geotechnical Engineering Conference STGEC, Williamsburg, VA, USA, September 15-18, 2025.
7. Ceccato, F., di Carluccio, G., **Yerro, A**., 2024. Simulating real landslides with MPM: an overview. ALERT Workshop 2024, Aussois, France, September 30 – October 2, 2024.
8. *Alsardi, A., **Yerro, A**., Long, C., 2024. Recent advances in isogeometric MPM. Anura3D online workshop, June 28, 2024.
9. *Alsardi, A., **Yerro, A**., Long, C., 2024. Mitigating volumetric locking in IGA MPM. MPM 2024 Workshop. Berkeley, California, US, September 5-6, 2023.
10. *Toro Rojas, D., **Yerro, A**., Neto, M.P.C., 2023. MPM analysis of karst systems as possible rupture inducers of tailings dams. 8th International Conference on Particle-based Methods. Fundamentals and Applications. Milan, Italy, October 9-11, 2023.
11. *Alsardi, A., **Yerro, A**., 2023. Recent developments towards Isogeometric Material Point Method. MPM 2023 Workshop. Orono, Maine, US, September 14-15, 2023.
12. *Urmi, Z.A., **Yerro, A**., Saeidi, A., 2023. Application of MPM for the prediction of retrogressive failure in sensitive clay slopes. MPM 2023 Workshop. Orono, Maine, US, September 14-15, 2023.
13. *Alsardi, A., **Yerro, A**., Long, C., Zhang, D. 2023. Towards isogeometric MPM. 17th US National Congress on Computational Mechanics. Alburquerque, New Mexico, July 23-27, 2023.
14. *Alsardi, A., **Yerro, A**., 2022. Coseismic site response and slope instability in MPM. MPM 2022 Workshop. Austin, Texas, US, August 23, 2022.
15. *Alsardi, A., **Yerro, A**., 2022. Simulation of coseismic landslides using MPM. Anura3D online workshop, April 22, 2022.
16. *Aviles, L.A., Ceccato, F., *Di Carluccio, G., *Girardi, V., Martinelli, M., Pinyol, N., **Yerro, A.**, 2021. Modelling large displacement unsaturated soil behaviour in MPM. VII International Conference on Particle-based Methods. Hamburg, Germany, October 4-6, 2021 (hybrid event).
17. *Zambrano-Cruzatty, L., *Yost, K., **Yerro, A**., Martinelli, M., Galavi, B., 2021. Modelling penetration problems with MPM. VII International Conference on Particle-based Methods. Hamburg, Germany, October 4-6, 2021 (hybrid event).
18. *Alsardi, A., *Di Carluccio, G., *Lemus, L., **Yerro, A**., Pinyol, N., 2021. Modelling coseismic landslides with Anura3D. VII International Conference on Particle-based Methods. Hamburg, Germany, October 4-6, 2021 (hybrid event).

19. **Yerro, A**., *Girardi, V., Ceccato, F., 2021. Multi-phase MPM Approaches for Unsaturated Soils. 16th U.S. National Congress on Computational Mechanics. Online, July 25-29, 2021.
20. *Zambrano-Cruzatty, L., *Yost, K., **Yerro, A**., 2021. MPM modeling of large deformations and soil-structure interaction in geotechnical in-situ testing. 16th U.S. National Congress on Computational Mechanics. Online, July 25-29, 2021.
21. *Alsardi, A., **Yerro, A**., 2021. Simulation of earthquake-triggered landslides and site response using the Material Point Method. 16th U.S. National Congress on Computational Mechanics. Online, July 25-29, 2021.
22. **Yerro, A.**, *Nissar, N., 2021. Internal shearing in compound landslides and consequences on structure interaction. Prep Workshop - 3rd International Conference on Natural Hazards & Infrastructure. Online, June 23, 2021.
23. *Cooper, J., Martin, E.R., *Yost, K.M., **Yerro, A**., Green, R.A., 2021. New Inverse Problem Approach to Thin Soil Layer Identification Applications in Earthquake Engineering. Mathematical Congress of the Americas 2021. Online, July 12-23, 2021.
24. Ceccato, F., **Yerro, A**., *Girardi, V., 2021. Overview of MPM formulations for unsaturated soils. IX International Conference on Coupled Problems in Science and Engineering. Online, June 2021.
25. *Pierce, I., **Yerro, A**., 2021. Post-triggering analysis of the 2018 Cadia tailings dam failure. Anura3D online workshop, April 2020.
26. *Monzer, A., Faramarzi, A., Chapman, D., **Yerro, A**., 2021. Soil Fluidisation around Pressurised Leaking Pipe. Anura3D online workshop, April 2020.
27. **Yerro, A**., *Murphy, J., Soga, K., 2020. Advancements on the Material Point Method for the modeling of internal erosion. Workshop on Internal Erosion (EWG-IE 2020). Milano, Italy, December 2020 (online event).
28. **Yerro, A**., *Murphy, J., Soga, K., 2019. Advancements on the simulation of internal erosion processes with the Material Point Method. In: Proc. 6th International Conference on Particle-based Methods. Fundamentals and Applications. Barcelona, Spain, October 2019.
29. **Yerro, A**., Soga, K., Bray, J., 2018. Modeling of landslides with the Material Point Method. 13th World Congress in Computational Mechanics, New York, New York, US, July 2018.
30. *Zambrano-Cruzatty, L., **Yerro, A**., Stark, N., 2018. Numerical simulation of free fall penetrometer deployment using MPM. 13th World Congress in Computational Mechanics, New York, New York, US, July 2018.
31. **Yerro, A**., Soga, K. 2017. Modeling multi-phase problems in geotechnics with the Material Point Method. 10th Material Point Method Workshop, Lawrence Livermore National Laboratory, Livermore, California, U.S., September 2017.
32. *Xu, X., **Yerro, A**., Soga, K. 2017. Numerical modeling and simulation of the wheel rotation problem with the material point method. 10th Material Point Method Workshop, Lawrence Livermore National Laboratory, Livermore, California, U.S., September 2017.
33. **Yerro, A**., Rohe, A., Soga, K., 2017. Application of MPM to model internal erosion processes in bi-modal soils. Congress on Numerical Methods in Engineering CMN2017, Valencia, Spain, July 2017.
34. Soga, K., Alonso, E., **Yerro, A**., Kumar, K., Bandara, S. 2016. Trends in large-deformation analysis of landslide mass movements with particular emphasis on the material point method. 1st International Conference on Natural Hazards & Infrastructure, Chania, Greece, June 2016.
35. **Yerro, A**., Pinyol, N., Alonso, E., 2016, Internal rock damage during landsliding: kinematic effects. 12th International Symposium on Landslides, Naples, Italy, June 2016.

36. **Yerro, A**., Alonso, E., Pinyol, N., 2015. Extension of the Material Point Method for unsaturated soils: 1 point-3 phase MPM formulation. 13rd International Conference on Computational Plasticity. Fundamentals and Applications (COMPLAS XIII), Barcelona, Spain, September 2015.
37. **Yerro, A**., Castellvi, H., Alonso, E., 2015. Modelling of the Selborne failure and post-failure with the MPM. 4th International Conference on Particle-Based Methods 2015, Barcelona, Spain, September 2015.
38. **Yerro, A**., Alonso, E., Pinyol, N., 2013. Modelling of landslides with the material point method. Congress on Numerical Methods in Engineering – CMN2013, Bilbao, Spain, June 2013.
39. **Yerro, A**., 2011. Solving coupled hydro-mechanical problems with the Material Point Method. 2nd International Conference on Particle-Based Methods 2011, Barcelona, Spain, October 2011.

OTHER PAPERS AND REPORTS

1. *Samanta, S., **Yerro, A**., Hosseini, R., 2026. Controlling Settlement Due to Adjacent Loading Using Sheet-Pile Walls: Insights from Finite Element Analysis. Geotechnical and Geological Engineering. Report of a study performed by the Virginia Tech Center for Geotechnical Practice and Research. January 2026, CGPR #110.
2. **Yerro, A**., Ceccato, F, 2023. "Soil-water-structure interactions. ", Geotechnics 3 (2), 301-305.
3. Soga, K., Alonso, E., **Yerro, A**., Kumar, K., Bandara, S., Kwan, J. S. H., Koo, R. C. H., Law, R. P. H., Yiu, J., Sze, E. H. Y. and Ho, K. K. S. 2018. Closure to Discussion on: "Trends in large-deformation analysis of landslide mass movements with particular emphasis on the material point method," by J.S.H. Kwan, R.C.H Koo, R.P.H. Law, J. Yiu, E.H.Y. Sze, and K.K.S. Ho, Geotechnique, 68(5):457-458.
4. Anura3D MPM Research Community. "Anura3D MPM Software – Tutorial Manual.", Ed. Ceccato, F., Chmelnizkij A., Fern, J., Pinyol, N., Rohe, A., **Yerro, A**., <www.anura3d.com>
5. Anura3D MPM Research Community. "Anura3D MPM Software – Scientific Manual"., Ed. Ceccato, F., **Yerro, A**., Chmelnizkij A., Fern, J., Martinelli, M., Rohe, A. <www.anura3d.com>
6. Anura3D MPM Research Community. "Anura3D MPM Software – Verification Manual.", Ed. Ceccato, F., **Yerro, A**., Chmelnizkij A., Fern, J., Miermet, M., Rohe, A., Aboufirass, A. <www.anura3d.com>
7. **Yerro, A**., 2015. MPM modelling of landslides in brittle and unsaturated soils. Ph.D. thesis, Universitat Politecnica de Catalunya, Barcelona, Spain.

POSTERS PRESENTED AT VIRGINIA TECH RESEARCH EVENTS

1. *Roshan, A.R., **Yerro, A**. (2022) Numerical Study of Landslide Impact on Retaining Walls. Virginia Tech Hazard Research Day (VThRD20), April 22, 2022.
2. *Pierce, I., **Yerro, A**. (2020) Run-out Evaluation of the Cadia Tailings Dam Failure. Virginia Tech Hazard Research Day (VThRD20), October 2020.
3. *Zambrano-Cruzatty, L., **Yerro, A**. (2019) Advanced research to evaluate scour and erosion. Virginia Tech Hazard Research Day (VThRD19), October 2019.
4. *Copana, J., **Yerro, A**. (2019) Slope stabilty analysis subjected to seismic loads. Virginia Tech Hazard Research Day (VThRD19), October 2019.
5. *Thum, T.S., **Yerro, A**., *Ye, E., *Saade, A., Green, R.A., Wissmann, K. (2019) Numerical modeling of Rammed Aggregate Piers in Liquefiable Soil Under Dynamic Loading. Virginia Tech Hazard Research Day (VThRD19), October 2019.

Invited Keynote Presentations & Lectures

KEYNOTE LECTURES

1. "Unsaturated soils and large deformations with the Material Point Method." 4th European Conference on Unsaturated Soils, Lisbon, Portugal (October 21, 2020)

RELEVANT GUEST LECTURES

1. "Modelling multiphase problems and soil-structure interaction with the Material Point Method." Workshop Numerical Methods in Geotechnics 2022, Hamburg, Germany. (September 13, 2022)
2. "The Material Point Method: an emerging tool for the simulation of large deformations and soil-water-structure interactions in geotechnical engineering." 70th Annual Geotechnical Engineering Conference, Minnesota Geotechnical Society, Minneapolis, Minnesota, U.S. (February 18, 2022)
3. "MPM developments for the simulation of coseismic landslides & internal erosion processes" 2nd International Workshop on Numerical Simulation Methods for Large Deformation Problems in Geotechnical Engineering. Shanghai (online, more than 3,000 attendees) (September 18, 2021)
4. "Modelling large deformation problems in geotechnics." Geotechnical Seminar of the Cambridge University Geotechnical Society, U.K. (March 19, 2021, online)
5. "MPM modelling of landslides in brittle and unsaturated soils." Workshop on Numerical Simulation Methods for Large Deformation Problems in Geotech. Tongji University, Shanghai, China (May 23, 2019)

Teaching Experience

UNDERGRADUATE AND GRADUATE COURSES

- CEE 3514 – Introduction to geotechnical engineering, Virginia Tech, 3 credits (taught in Fall 2017, Spring 2018, Spring 2019, Fall 2019, Fall 2020, Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024)
- CEE 5500 – Numerical Methods in Geotechnics, Virginia Tech, 3 credits (taught in Spring 2019, Spring 2020, Spring 2021, Spring 2022, Spring 2023, Spring 2024)
- CEE 5564 – Seepage and Earth Structures, Virginia Tech, 3 credits (taught in Spring 2025)
- CEE 5984 – SS: Modeling with MPM, Virginia Tech, 1 credit (taught in Fall 2018)

PRESENTATIONS IN SHORT COURSES AND WORKSHOPS

1. Short Course on Particle-Based Methods in Engineering and Applied Science. International Centre for Numerical Methods in Engineering, Barcelona, Spain, October 18-19. 2025
2. Short Course on Particle-Based Methods in Engineering and Applied Science. International Centre for Numerical Methods in Engineering, Milan, Italy, October 7-8. 2023.
3. Methods for Large Deformation Problems in Geotech. Tongji University, Shanghai, China, May 23-24, 2019.
4. Modelling landslides with the Material Point Method. Research Seminar at Newcastle University, Newcastle, UK, March 6, 2017.
5. Modelling large deformation problems in geotechnics. Graduate seminar in Geotechnical Engineering at Virginia Tech, Blacksburg, US, January 23, 2017.
6. v-v formulations and three-phase problems: applications to unsaturated soils. One-day School: Material Point Method for Geohazards. Project RISE GEO-RAMP (H2020 MSCA-RISE-2014 GA 645665), Barcelona, Spain, October 12, 2016.
7. Modelling excavation and effect on stress initialization. MPM Research Community Workshop Winter 2015, Cambridge, UK, December 15, 2015.

8. Critical time step for the 2-phase 1-point explicit algorithm. MPM Research Community Workshop Summer 2015, Barcelona, Spain, June 5, 2015
9. Material Point Method in unsaturated materials. 7th ALERT Olek Zienkiewicz Course. Unsaturated Soil Mechanics: From Fundamentals to Applications, Barcelona, Spain, May 25-29, 2015.
10. MPM for unsaturated soils. MPM-Dredge Internal Workshop, Cambridge, UK, December 9, 2014.
11. Three-phase formulation for unsaturated analyses and strain softening model. MPM-Dredge Internal Workshop, Delft, The Netherlands, December 17, 2013.

Supervising Experience

PHD THESIS

Completed

1. Advancements of Numerical Simulation Techniques to Model Geotechnical Problems in the Nearshore Zone. Student: Luis Zambrano-Cruzatty. Starting date: Spring 2018. Completion date: Summer 2021. Virginia Tech.
   Yerro's role: **Principal advisor**
2. Stability and runout of river levees subjected to rainfall and water table changes. Student: Veronica Girardi. Starting date: Fall 2018. Completing date: Spring 2022. University of Padua (Italy).
   Yerro's role: **Official co-advisor** (Principal advisor: Simonini P.)
3. Study of multi-thin-layer effects on CPT data. Student: Kaleigh Yost. Starting date: Spring 2019. Completion date: Fall 2022. Virginia Tech.
   Yerro's role: **Official co-advisor** (Co-principal advisor: Green R.)
4. Prediction of Structural Integrity of the Ground and Buried Utilities Using Numerical Simulation of Soil Erosion around Leaking Pipe. Student: Ali Monzer. Supervisors: Faramarzi F., Chapman D., and Yerro A. Starting date: Fall 2018. Completion date: Spring 2023. University of Birmingham (UK).
   Yerro's role: **Official co-advisor** (Principal advisor: Faramarzi F.)
5. Prediction of retrogressive landslide in sensitive clays with the material point method. Student: Zinan Ara Urmi. Supervisors: Saeidi A., and Yerro A. Starting date: Fall 2020. Completion date: Summer 2024. University of Quebec at Chicoutimi (Canada).
   Yerro's role: **Official co-advisor** (Principal advisor: Saeidi A.)
6. Study of karst systems using the material point method. Student: Daniela Toro Rojas. Supervisors: Porfírio Cordão Neto M., and Yerro A. Starting date: Fall 2020. Completion date: Summer 2024. University of Brasilia (Brazil).
   Yerro's role: **Official co-advisor** (Principal advisor: Porfírio Cordão Neto M.)
7. Numerical and experimental modeling of tire–mud interaction. Student: Varsha Swamy. Starting date: Fall 2021. Completing date: Spring 2025. Virginia Tech.
   Yerro's role: **Official co-advisor** (Principal advisor: Sandu, C.)
8. Simulating earthquake-triggered runout using higher-order hydromechanical MPM and PM4Sand. Student: Abdelrahman Alsardi. Starting date: Fall 2019. Completing date: Fall 2025. Virginia Tech.
   Yerro's role: **Principal advisor**

Ongoing

9. Experimental and numerical understanding of CPT cone tip resistance in unsaturated soils. Student: Li Ruidong. Starting date: Spring 2023. Completion date: Fall 2026. Hong Kong University of Science and Technology (China)
   Yerro's role: **Official co-advisor** (Principal advisor: Leung A.K.)
10. Initiation and progression of internal cavities in levees. Student: Sukrityranjan Samanta. Starting date: Fall 2023. Completion date: Spring 2027. Virginia Tech
    Yerro's role: **Principal advisor**
11. Investigation on the trafficability of soft soils. Student: Michael Bennett. Starting date: Fall 2025. Completion date: Fall 2029. Virginia Tech
    Yerro's role: **Principal advisor**
12. Vegetation effects on rainfall-triggered landslides. Student: Fereshteh Rahmani. Starting date: Fall 2026. Completion date: Fall 2030. Virginia Tech
    Yerro's role: **Principal advisor**

MS RESEARCH THESIS

Completed

1. Numerical Analysis of RAP Elements under Dynamic Loading. Author: Angela C. Saade. Supervisor: Yerro A. Completion date: Fall 2018, Virginia Tech.
   Yerro's role: **Principal advisor**
2. Analyzing internal shearing in compound landslide using MPM. Student: Nahmed Nissar. Supervisor: Yerro A. Completion date: Spring 2020, Virginia Tech.
   Yerro's role: **Principal advisor**
3. Seismic Slope Stability: A Comparison Study of Empirical Predictive Methods with the Finite Element Method. Student: Julio Copana. Supervisor: Yerro A. Completion date: Summer 2020, Virginia Tech.
   Yerro's role: **Principal advisor** (co-advisor: Rodriguez-Marek A.)
4. Identification of Key Factors Controlling the Runout of the Cadia Tailing Dam Failure, Australia, 2018. Student: Ian Pierce. Supervisor: Yerro A. Completion date: Spring 2021, Virginia Tech.
   Yerro's role: **Principal advisor**
5. MPM numerical Analysis of Free Fall Penetrometer Impact on Saturated Sand. Student: Fuat Furkan. Supervisor: Yerro A. Completion date: Summer 2021, Virginia Tech.
   Yerro's role: **Principal advisor**
6. Characterization of soft clay and clay-tire interaction for the prediction of ground mobility. Student: Rashna Pandit. Supervisor: Yerro A. Completion date: Summer 2023, Virginia Tech.
   Yerro's role: **Principal advisor** (co-advisor: Bernardo Castellanos)
7. MPM modeling of the impact of compound landslides on a rigid wall. Student: Aaditaya Roshan. Supervisor: Yerro A. Completion date: Summer 2023, Virginia Tech.
   Yerro's role: **Principal advisor**
8. Estimating the effectiveness of stone columns in mitigating post-liquefaction settlement using Plaxis2D. Student: Roisha Maharjan. Co-supervisors: Yerro A. and Rodriguez-Marek A. Completion date: Fall 2023, Virginia Tech.
   Yerro's role: **Principal advisor** (co-advisor: Rodriguez-Marek A.)
9. MPM analysis of FFP in sand considering high-strain-rate effects. Student: Jonathan Moore. Co-supervisors: Yerro A. and Stark N. Completion date: Spring 2025, Virginia Tech.

Yerro's role: **Principal advisor** (co-advisor: Stark N.)

10. Study of The Deformations Caused by Underground Excavation Using the Materiel Point Method. Student: Carole Karam. Supervisor: Yerro A. Completion date: Spring 2025, Virginia Tech.
    Yerro's role: **Principal advisor**
11. Numerical investigation on the performance of matting systems on soft soils. Student: Jasleen Behora. Supervisor: Yerro A. Completion date: Spring 2025, Virginia Tech.
    Yerro's role: **Principal advisor** (co-advisor: Bernardo Castellanos)
12. Finite Element Modeling and Experimental Testing of Tire-Soil Interactions for Off-Road Vehicle Performance. Student: Destiny Mason. Co-supervisors: Sandu C. and Yerro A. Completion date: Spring 2025, Virginia Tech.
    Yerro's role: **Official co-advisor** (Principal advisor: Sandu, C.)
13. Mechanical Root Reinforcement for Slope Stability: A State-of-the-Art Review and a Proposed Trait-Based Functional Root Classification System. Student: Swostika Dhakal. Supervisor: Yerro A. Completion date: Spring 2026, Virginia Tech.
    Yerro's role: **Principal advisor**

Ongoing

UNDERGRADUATE RESEARCH

1. Dynamic site response in MPM (CEE 4994). Student: Jonathan Moore. Yerro's role: **Principal advisor**.
2. Database of Free Fall Penetrometer field data. Student: Jared Allen. Yerro's role: **Principal advisor**.

POSTDOC RESEARCH

1. Design Adequacy Analysis of the Poplar Creek Box Culverts. Student: George Idiculla. Co-supervisors: Jaques E., Yerro A., Koutromanos I.

VISITOR SCHOLARS

1. Veronica Girardi, Ph.D. student, Università degli Studi di Padova (Italy), January 10, 2020 – June 10, 2020
2. Ruidong Li, Ph.D. student, Hong Kong University of Science and Technology (China), September 10 – October 20, 2023, and September 20, 2024– December 6, 2024
3. Maria Teresa Yubero de Mateo, Assistant Professor, Polytechnic University of Catalonia (Spain), January 15, 2025 – July 15, 2025
4. Enric Bonet Gil, Assistant Professor, Polytechnic University of Catalonia (Spain), January 15, 2025 – July 15, 2025

EXAMINER IN INTERNATIONAL PHD DISSERTATIONS

1. Università della Calabria (Italy), Luigi Pugliese, 2020, "Post-Failure Analysis of Landslides Using the Material Point Method" (Chair: Antonello Troncone);
2. University of Tasmania (Australia), Gysbert Basson, 2022, "A material point method to simulate macro-scale problems in mining" (Chair: Andrew Bassom)
3. Soutenue à Aix-Marseille Université (France), Sacha Duverger, 2023, "A multi-scale, MPMxDEM, numerical modelling approach for geotechnical structures under severe loading" (Chair: Pierre Philippe)

4. University of Western Australia (Australia), Yimin Li, 2023, "Simulations of rapid spudcan penetrations with the material point method" (Chair: Mark Randolph)
5. Ruhr-Universität Bochum (Germany), Cristian David Rodriguez Lugo, 2024, "Contributions to the modelling of large deformations of water-saturated soils: A particle-based approach" (Chair: Torsten Wichtmann)
6. Georgia Tech (Georgia, US), Renzo Cornejo, 2025, "Assessment of large deformation problems in tailings engineering using particle-based methods" (Chair: Jorge Macedo)
7. Georgia Tech (Georgia, US), Vivek Bokkisa, 2025, "Multiscale assessment of fabric in granular soils" (Chair: Jorge Macedo)

Special Achievements from Current & Former Students

1. Mr. Abdelrahman Alsardi – 2019 Virginia Tech Pratt Graduate Fellowship Award ($5,000)
2. Mr. Tat Shing Thum – 2019 Deep Foundation Institute Educational Trust At-Large General Scholarship Award ($2,000)
3. Mr. Luis Zambrano-Cruzatty – 2020 ASCE Trent R. Dames and William W. Moore Fellowship ($3,000)
4. Mr. Ian Pierce – 2020 2nd place in poster competition in Virginia Tech Hazard Research Day
5. Ms. Kaleigh Yost – 2020 ASCE Richmond Branch Civil Engineering Scholarship ($1,000)
6. Ms. Kaleigh Yost – 2020 Virginia Space Grant Consortium Fellowship ($6,000)
7. Mr. Luis Zambrano-Cruzatty – Tenure-track faculty position at the University of Maine (2021)
8. Ms. Kaleigh Yost – 2021 Institute of International Education Graduate Research Experience (IIE-GIRE) Fellowship ($9,000)
9. Mr. Abdelrahman Alsardi – 2021 Deep Foundation Institute Educational Trust At-Large Scholarships Award from DFI Educational Trust ($2,250)
10. Mr. Abdelrahman Alsardi – 2021 USNCCM16 Conference Award ($295)
11. Mr. Abdelrahman Alsardi – 2021 ASCE Richmond Branch Civil Engineering Scholarship ($1,500)
12. Ms. Varsha Swamy – 2021 Automotive Research Center – Excellence in Research Award ($12,500)
13. Mr. Abdelrahman Alsardi – 2022 Center for Nonlinear Studies (CNLS) Summer Student Program Fellowship – Los Alamos National Laboratory
14. Mr. Abdelrahman Alsardi – 2023 Center for Nonlinear Studies (CNLS) Summer Student Program Fellowship – Los Alamos National Laboratory
15. Mr. Abdelrahman Alsardi – 2024 Center for Nonlinear Studies (CNLS) Summer Student Program Fellowship – Los Alamos National Laboratory
16. Ms. Varsha Swamy – Science, Mathematics, and Research for Transformation (SMART) Program Scholarship, DoD (Full tuition + $33,000 per year)
17. Ms. Kaleigh Yost – Tenure-track faculty position at Pennsylvania State University (2023)
18. Mr. Jonathan Moore – MS Charles Via M.S. Fellowship ($2,666.68/month for three semesters)
19. Mr. Abdelrahman Alsardi – 1st place in the T-division GRA Talk competition at Los Alamos National Laboratory.
20. Mr. Luis Zambrano-Cruzatty – Tenure-track faculty position at North Carolina State University (2025)
21. Mr. Michael Bennett – MS Charles Via M.S. Fellowship ($32,640/year for four years)
22. Ms. Fereshteh Rashmani – 2026 Virginia Tech Hawkins Memorial Graduate Fellowship ($4,815)

Grants & Funding

RESEARCH PROJECTS

1. (2024-2029) **Principal Investigator** – CAREER: Transformative Understanding of Rainfall-Triggered Landslides with Vegetation Effects from a Climate Change Perspective: Initiation and Consequences (Award #2340657) – Sponsor: National Science Foundation (NSF) – $570,041
2. (2024-2027) **Principal Investigator** –Numerical investigation on the performance of matting systems on soft soils– Sponsor: U.S. Army Engineer Research and Development Center (ERDC) – $287,812
3. (2024-2025) **Co-Principal Investigator** – Design Adequacy Analysis of the Poplar Creek Box Culverts – Sponsor: Virginia Transportation Research Council (VTRC) – $420,182 (Yerro's portion: $126,054)
4. (2023-2025) **Principal Investigator** – Unified multi-phase numerical framework for understanding large deformations of coseismic slope failures in complex sites (Award #2211002) – Sponsor: National Science Foundation (NSF) – $310,085
5. (2023-2027) **Principal Investigator** – Numerical modeling of water retaining structures as a result of fluid-solid interaction – Sponsor: U.S. Army Engineer Research and Development Center (ERDC) – $451,271
6. (2022-2025) **Principal Investigator** – Seafloor characterization from free fall penetrometers using machine learning – Sponsor: US Naval Surface Warfare Center –$390,766 (Yerro's portion: $117,229)
7. (2022-2025) **Co-Principal Investigator** – TA3: Tire–mud interaction modeled using Smoothed Particle Hydrodynamics and Finite Element Analysis (SPH-FEA) techniques and experimental validation – Sponsor: US Department of the Army, Automotive Research Center – $379,575 (Yerro's portion: $195,181)
8. (2021) **Principal Investigator** – Run-out of large deformation assessment of mine tailings – Sponsor: Knight Piesold Consultores S.A. – $15,780
9. (2019-2021) **Co-Principal Investigator** – EAGER: Exploration of an Interdisciplinary Approach to Resolving a Critical Issue in Evaluating Liquefaction Hazard of Challenging Soil Sites (Award #1937984) – Sponsor: National Science Foundation (NSF) – $157,973 (Yerro's portion: $78,986)
10. (2017-2019) **Principal Investigator** - Study of the Performance of RAP Elements Under Dynamic Loading - Sponsor: Geopier Foundation Company - $98,000
11. (2015-2017) **Researcher supporting expert panel** – SR-530 landslide case (Oso Landslide), State of Washington.
12. (2015-2017) **Post-doctoral researcher** – MPM-DREDGE – PIAP-GA-2012-324522. Industry–Academia Partnerships and Pathways (IAPP) project (University of Cambridge Coordinators: Prof. Kenichi Soga & Prof. Dongfang Liang; Deltares Coordinator: Dr. Hans Teunissen) – Seventh Framework Program (FP7/2007-2013) of the European Commission (2013–2017).
13. (2014-2015) **Researcher** – PARTING – Particle Methods in Geomechanics (UPC Coordinators: Prof. E. Alonso, Dr. N.M. Pinyol) – National Spanish Ministry of Economy and Competitiveness (2014-2018)
14. (2014) **Supervisor** – KPP 2014 – WTI 2017 Cluster 2. Design Rules Macrostability (Deltares Coordinator: Alexander van Duinen) – Dutch Public Waterworks Organisation (Rijkswaterstaat)
15. (2009-2013) **PhD student** – BIGRISK – BIA2008-06614. Progressive failure and reactivation of big landslides: analysis, forecasting and risk (UPC Coordinators: Prof. E. Alonso and Prof. J. Corominas) – National Spanish Ministry of Science and Innovation (2008-2013)

16. (2008-2009) **Researcher** – LLISCAT – PT2008-S0304-COROMINAS01. Creation of a database of landslide in Catalonia and Andorra (UPC Coordinator: Prof. J. Corominas) – Institute of Catalan Studies (2008-2010)
17. (2008) **Researcher** – MODEVALL – CGL2005-05282/BTE. Site characterisation and hydrological-mechanical modelling of the Landslide of Vallcebre. (UPC Coordinator: Prof. J. Corominas) – National Spanish Ministry of Education and Science (2005-2008)

Additional Information

ORGANIZATION OF EVENTS

- **Scientific Committee member** - X International Conference on Particle-based Methods (PARTICLES 2027), Barcelona, Spain, October 2027
- **Scientific Committee member** - IX International Conference on Particle-based Methods (PARTICLES 2025), Barcelona, Spain, October 2025
- **Session Chair** for Geo-Congress 2022, 2023, 2024
- **Session Chair** for 2nd International Workshop on Numerical Simulation Methods for Large Deformation Problems in Geotechnical Engineering. Shanghai (online), more than 3,000 attendees, September 18, 2021
- **Principal Organizer**: 12th Annual MPM Workshop, September 10-12, 2019, Blacksburg, US (35 participants)
- **Co-organizer and scientific committee**: 2nd International Conference on the Material Point Method for Modelling Soil-Water-Structure Interaction, Cambridge, United Kingdom, January 2019
- **Co-organizer and scientific committee**: 1st International Conference on the Material Point Method, Deltares, Delft, The Netherlands, 10–13 January 2017

ORGANIZATION OF ANURA3D WORKSHOPS AND COURSES

Anura3D is a research-oriented, open computational platform that implements the Material Point Method for simulating large-deformation problems in geotechnical and geomechanical engineering. It is widely used worldwide to model coupled soil–water–structure interactions, landslides, and failure processes beyond the limits of traditional Finite Element methods.

- Anura3D Online Workshop 2026 & official release of Anura3D_2026 (open-source) (165 attendees) — 4 September 2026
- Anura3D In-person MPM Workshop, Training course & official release of Anura3D_2025 (open-source), Universitat Politècnica de Catalunya, Barcelona, Spain (35 in-person attendees) — 30–31 January 2025
- Anura3D Workshop, 15th Annual Material Point Method Workshop, University of California, Berkeley, Berkeley, CA, USA — 5–6 September 2024
- Anura3D Online Workshop 2024 & official release of Anura3D_2024 (open-source) (165 attendees) — 28 June 2024
- 14th Annual Material Point Method Workshop, University of Maine, Orono, ME, USA — 13–14 September 2023
- Anura3D Online Workshop 2023 & official release of Anura3D_2023 (open-source) (280 attendees) — 30 June 2023
- Anura3D Online Workshop 2022 & official release of Anura3D_2022 (open-source) (150 attendees) — 22 April 2022

- Anura3D Online-External Workshop 2021 & official release of Anura3D_2021 (open-source) (125 attendees) — 30 April 2021
- Anura3D Training Course, Tongji University, Shanghai, China — 25 May 2019
- Anura3D Training Course, University of Cambridge, Cambridge, UK (14 participants) — 11 January 2019
- Anura3D Training Course, Universitat Politècnica de Catalunya, Barcelona, Spain (17 participants) — 8 June 2018
- Anura3D Workshop and Training Course, University of California, Berkeley, Berkeley, CA, USA — 8 May 2018
- Anura3D Training Course, Technische Universität Hamburg, Hamburg, Germany (16 participants) — 29 September 2017
- Anura3D Training Course, Deltares, Delft, The Netherlands — 12–13 January 2017
- Anura3D Workshop, University of Padova, Padova, Italy (29 participants) — 21 June 2016
- MPM Research Community Training Course, University of Cambridge, Cambridge, UK (21 participants) — 3 May 2016
- MPM Research Community Workshop, University of Cambridge, Cambridge, UK (33 participants) — 15 December 2015
- MPM Research Community Workshop,
- Universitat Politècnica de Catalunya, Barcelona, Spain (22 participants) — 5 June 2015
- MPM-DREDGE Internal Workshop, University of Cambridge, Cambridge, UK (29 participants) — 9 December 2014

JOURNAL EDITOR

- **Editorial Board**, Computers and Geotechnics, ScienceDirect (2023 – present)
- **Associate Editor**, Journal of Computing in Civil Engineering, ASCE (2025 – present)
- **Associate Editor**, Mechanics-Based Design of Structures and Machines, Taylor & Francis (2022 – present)
- **Guest Editor Special Issue** "Soil-Water-Structure Interaction", Geotechnics, MPDI

PEER-REVIEWER

- *Journals*: Canadian Geotechnical Journal, Computer Methods in Applied Mechanics and Engineering, Computers and Geotechnics, Engineering Geology, Engineering Computations, Environmental Earth Sciences, Géotechnique, Geoenvironmental Disasters, Geotechnical and Geological Engineering, International Journal of Geomechanics, Journal of Geotechnical and Geoenvironmental Engineering, Landslides, Ocean Engineering, Rivista Italiana di Geotecnia, Soils and Foundations, Tunnelling and Underground Space Technology,
- *Conferences*: ASCE GI Geo-Conference, ASCE GI Geo-Extreme, EERI National Conference on Earthquake Engineering, ISSMGE European Conference on Numerical Methods in Geotechnical Engineering.
- *Funding agencies*: Panelist for the National Science Foundation.