

Nabil YOUNES

Tripoli, Lebanon

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Education

- **Ph.D. in Civil Engineering** **La Rochelle, France & Calgary, Canada**
University of La Rochelle: Joint-Ph.D. with the University of Calgary 10/2020 – 11/2023
Dissertation: Micromechanical Study of Capillary Regime Transitions in Partially Saturated Granular Soils
- **Polytech' Orléans** **Orléans, France**
Bachelor of Engineering in Civil Engineering 2017 – 2020
- **University of Orléans** **Orléans, France**
M.Sc. in Mechanics (Double Degree) 2019 – 2020
- **Lebanese University** **Beirut, Tripoli, Lebanon**
Completed three years before transferring to Polytech' Orléans. 2014 – 2017

Academic Experiences

- **Beirut Arab University** **Tripoli, Lebanon**
Assistant Professor 09/2026 – Present
 - Teaching undergraduate courses in soil mechanics, engineering geology, statics, and ground improvement;
 - Supervising undergraduate Final Year Projects;
 - Conducting research in computational geomechanics, unsaturated soils, and numerical modeling of granular materials;
- **University of Montpellier, IUT de Nîmes – LMGC Laboratory** **Montpellier, France**
Assistant Professor 09/2024 – 08/2026
 - Teaching undergraduate courses in geotechnical engineering and construction (see *Teaching Activities* section);
 - Developing course materials, laboratory exercises, and assessment methods for undergraduate civil engineering education.
 - Conducting research on DEM-LBM coupling for micromechanics of unsaturated granular materials and rheology under dynamic conditions;
 - Integrating AI and Machine Learning techniques for predictive modeling and data-driven analysis in geomechanics and material behavior;
 - **Additional Role:** Geotechnical Laboratory Manager at the IUT de Nîmes (Sep 2025 – Aug 2026): Responsible for laboratory operations, Oversight of lab activities, equipment management, safety procedures, and the coordination of experimental activities for teaching and research.
- **University of La Rochelle (Joint Ph.D. with the University of Calgary)** **La Rochelle & Calgary**
Ph.D. Candidate in Civil Engineering 10/2020 – 11/2023
 - Developing numerical code using C/C++/Python/CUDA-C for modeling dike instability under wetting/drying cycles at the microscale;
 - Participating in meetings with academic and industrial partners;
 - Authoring scientific papers, technical reports, and project proposals;
 - Presenting research at international conferences and workshops.
- **Polytech' Orléans** **Orléans, France**
Capstone Project: Probabilistic Analysis of Tunnel Stability 09/2019 – 03/2020
 - Investigating tunnel failure probability using a probabilistic approach considering spatial variability of soil properties;
 - Applying Kriging interpolation and inverse problem techniques to optimize tunnel thickness based on reliability targets.
- **Polytech' Lille** **Lille, France**
Research Internship: Hydro-Mechanical Coupling in Landslides 06/2019 – 08/2019

- Developing Matlab code to calculate landslide displacement based on a hydro-mechanical model;
- Comparing numerical results with available field data.

Industry Experiences

- **Akkodis Pau: Consultant for TotalEnergies** **Pau, France**
02/2024 - 08/2024
Geonumerical Engineer
 - Developing numerical methods for calculating the geological representation of reservoirs;
 - Optimize existing numerical tools and codes (Python, C++, Java, etc.);
 - Identifying and integrate new state-of-the-art approaches from the literature to improve existing methods and solve new problems.
- **Itasca Consultants** **Lyon, France**
03/2020 - 08/2020
Engineering internship: Soil Reinforcement with Rigid Inclusions
 - Reviewing the technical requirements and specifications;
 - Analyzing geotechnical laboratory tests to select the appropriate constitutive law;
 - Modeling soil behavior with and without rigid inclusions in FLAC3D;
 - Participating in meetings with project partners to present our results;
 - Writing internal technical reports.
- **Engineering Services Center (ESC)** **Tripoli, Lebanon**
2016 - 2017
Civil Engineering Internship: Reinforced Concrete Design and Construction
 - Preparing structural drawings and reinforcement detailing for reinforced concrete structures;
 - Developing and reviewing shop drawings for foundations, columns, beams, and slabs;
 - Conducting site visits to monitor construction progress and execution of structural works;
 - Verifying compliance of construction activities with approved drawings and technical specifications;

Research Grants and Funded Projects

- **2026 – ANR–DFG PRCI (France–Germany)**
Project: MICAP-4D – Micromechanics-Integrated Capillary Analysis and Physics with High Resolution 4D CT and LBM-DEM Computations.
Role: Scientific Team Member and Ph.D. Supervisor (French team).
Total requested funding: EUR 592,787.23 (ANR: EUR 244,463.23; DFG: EUR 348,324.00).
Status: Accepted for funding (2026).

Research Supervision

- **Supervising: Ph.D. (2025 – Present)** Double Degree Program: La Rochelle University & University of Calgary
Topic: Application of AI for modeling unsaturated granular materials at the micro-scale.
- **Supervised: Research Internship (Summer 2025)** — University of Montpellier
Topic: Capillary bridges between complex geometries.
- **Co-supervised: Research Internship (Summer 2024)** — La Rochelle University
Topic: Constitutive law prediction using Neural Networks (Deep Learning).

Teaching Activities

Course Title	Details	Institution	Times Taught
CVLE 333 – Soil Mechanics	28 hours of lectures: Soil classification, phase relationships, effective stress, consolidation, and shear strength.	Beirut Arab University	1
CVLE 231 – Engineering Geology	28 hours of lectures: Earth structure, minerals, rocks, geological processes, and engineering applications.	Beirut Arab University	1
CVLE 528 – Soil and Site Improvement	35 hours of lectures: Ground improvement techniques, soil stabilization, and reinforcement methods.	Beirut Arab University	1
CVLE 210 – Statics	35 hours of lectures: Force systems, equilibrium, moments, and structural mechanics.	Beirut Arab University	1
CVLE 303 – Soil Mechanics, Foundations, Testing and Properties of Materials (For Architects)	14 hours of lectures and 28 hours of tutorials: Soil properties, classification, foundations, and geotechnical testing.	Beirut Arab University	1
Geotechnics I	20 hours of tutorials and 27 hours of lab instructions: Stresses, strains, Mohr–Coulomb criterion, direct shear test, oedometer test, permeability test.	University of Montpellier	2
Geotechnics II	16 hours of tutorials: Soil classification using CPT and SPT tests.	University of Montpellier	2
Drawing and Reading Architectural Plans using Revit and AutoCAD	8 hours of tutorials and 32 hours of lab instructions: Architectural drafting, CAD design, building plans.	University of Montpellier	2
Structural Mechanics I	18 hours of lab instructions: Trusses, finite element analysis, reactions.	University of Montpellier	1
Design Decisions and Solutions for Foundations and Building Structures	30 hours: Supervision of projects involving design decisions for both substructure (foundations and deep foundations) and superstructure (columns, beams, shear walls) of real-case buildings. Students analyze plans (Revit) and propose structural solutions.	University of Montpellier	2
Written and Oral Communication Skills	10 hours: Professional writing, public speaking, negotiation, teamwork, leadership, intercultural communication, and ethical practices.	University of Montpellier	2
Portfolio	6 hours: Competency development and self-assessment for civil engineering projects. Technical solution design, structural dimensioning, site organization, and life-cycle management.	University of Montpellier	1
Multi-phase LBM and Unsaturated Soils	2 hours: Theory, benchmarks, and DEM coupling at the REV scale.	Doctoral School, ALERT Geomaterials	2

Course Title	Details	Institution	Times Taught
Geotechnical Engineering I (ENCI 423)	96 hours of lab instructions: Soil classification, compaction, permeability, consolidation, shear box, and triaxial tests.	University of Calgary	1
Mechanics	34 hours of tutorials: Kepler's laws, projectile motion, work, and Bernoulli's principle.	University of La Rochelle	2

Publications

○ Peer-reviewed published papers

1. **N. Younes** and O. Millet. "Phase-field lattice Boltzmann study of air–water capillary bridge geometry." *Computers and Geotechnics* 196 (2026): 108051.
2. **N. Younes**, A. Wautier, R. Wan, O. Millet, and F. Nicot. "Hysteresis phenomenon within unsaturated granular assemblies: Capillary forces and matric suction." *Physical Review E* 113.3 (2026): 035401.
3. R. Bouchard, **N. Younes**, O. Millet, and A. Wautier. "Parameter optimization of phase-field-based LBM model for calculating capillary forces". *Computers and Geotechnics* 172 (2024): 106391, 2024.
4. **N. Younes**, A. Wautier, R. Wan, O. Millet, F. Nicot, and R. Bouchard. "DEM-LBM coupling for partially saturated granular assemblies." *Computers and Geotechnics* 162 (2023): 105677.
5. **N. Younes**, Z. Benseghier, O. Millet, A. Wautier, F. Nicot, and R. Wan. "Phase-field Lattice Boltzmann model for liquid bridges and coalescence in wet granular media." *Powder Technology*, vol. 411 (2022): 117942.
6. Z. Benseghier, O. Millet, P. Philippe, A. Wautier, **N. Younes**, and E. Liberge. "Relevance of capillary interfaces simulation with the Shan-Chen multiphase LB model." *Granular Matter* 24, no. 3 (2022): 82;

○ Conference Papers

1. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. Microscale Dynamics of Unsaturated Soil Behavior: Insights into Wetting and Drying Processes. *4th Pan-American Conference on Unsaturated Soils, Ottawa, Canada, 2025*.
2. R. Wan, **N. Younes**, A. Wautier, O. Millet, F. Nicot. Deciphering unsaturated soil behaviour and transitions across all capillary regimes. *4th Pan-American Conference on Unsaturated Soils, Ottawa, Canada, 2025*.
3. **N. Younes**, I. Mouchrik, M. Slamia, N. Belayachi, and D. Hoxha. "Identification of Thermal Properties of Construction Materials Using Far-Field Contactless Temperature Measurements." In *Critical Thinking in the Sustainable Rehabilitation and Risk Management of the Built Environment: CRIT-RE-BUILT. Proceedings of the International Conference, Iași, Romania, November 7-9, 2019*, pp. 241-248. Springer International Publishing, 2021.

Invited Scientific Talks

- **Complexity, Granular Materials, and Disordered systems, 2025, Montpellier, France:**
"Pore-scale hysteretic transitions in unsaturated granular media using DEM-LBM".
- **Atelier de Mathématiques et Géosciences 2024, Chambéry, France:**
"Application de la méthode de Boltzmann sur réseau (LBM) aux assemblages granulaires partiellement saturés".

Conferences and Workshops

1. N. Younes, **S. Nezamabadi**, F. Radjai. "Influence of inter-particle friction variability on the mechanical behavior of Granular Materials". [Poster Presentation] *ALERT Workshop, Aussois, France, 2026*.
2. **N. Younes**, O. Millet, R. Wan, A. Wautier, F. Nicot. "Unsaturated Soils from a Micro-Mechanical Perspective" *Particles 2025, Barcelona, Spain*.
3. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. "Microscale Modeling of Capillary Effects in Unsaturated Granular Soils during Wetting and Drying Cycles." *ALERT-Geomaterials 2024, Aussois, France*.

4. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. "DEM-LBM Coupling: A Micro-Scale Approach for Understanding Unsaturated Soil Behavior." *WCCM-PANACM Vancouver, Minisymposium 0810 - Numerical modeling of granular and multiphase flows, Vancouver, Canada, 2024.*
5. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. "Multiphase LBM-DEM Coupling for Unsaturated Granular Media." *Particles, Milan, Italy, 2023.*
6. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. "Micromechanical study of capillary regime transitions in partially saturated granular soils." [Poster Presentation] *ALERT Workshop, Aussois, France. September 2023.*
7. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. "On the capillary stress in unsaturated granular assemblies." *Méca-J, France, 2023.*
8. **N. Younes**, R. Wan, A. Wautier, O. Millet, F. Nicot. "Modeling capillary transitions in unsaturated media across all saturation regimes." *NANGE, Assisi, Italy, 2023.*
9. **N. Younes**, Z. Benseghier, O. Millet, A. Wautier, F. Nicot, and R. Wan. "Multiscale modeling of maritime dikes under cyclic hydraulic loadings." [Poster Presentation] *ALERT Workshop, Aussois, France, 2022.*
10. **N. Younes**, Z. Benseghier, O. Millet, A. Wautier, F. Nicot, and R. Wan. "LBM approach for capillary bridges and associated forces in an air-water system." *CFM - Mécanique des milieux granulaires Nantes, France, 2022.*
11. **N. Younes**, Z. Benseghier, O. Millet, A. Wautier, F. Nicot, and R. Wan. "Multiphase Lattice-Boltzmann approach for capillary bridges and associated forces." *ICONSOM Sardinia, Italy, 2022.*
12. **N. Younes**, Z. Benseghier, O. Millet, A. Wautier, F. Nicot, and R. Wan. "A relevant phase-field-based Lattice Boltzmann Method for water-air capillary interfaces." *Méca-J, France, 2021.*

Academic Service

Journal Peer Reviewing:

- Granular Matter (Springer Nature)
- European Journal of Environmental and Civil Engineering (Taylor & Francis)
- Journal of Computational Physics (Elsevier)
- Journal of Petroleum Exploration and Production Technology (Springer Nature)

Conference Peer Reviewing:

- 11th International Conference on Physical Modelling in Geotechnics (ICPMG 2024)
- 4th Pan-American Conference on Unsaturated Soils

University Service:

- Member, Job Fair Organizing Committee (2026-2027),
Beirut Arab University
- Member, Engineering Day Organizing Committee (2026-2027),
Beirut Arab University

Technical Skills

- o **Geomechanics:** Unsaturated soil mechanics, landslides, constitutive models, macro and micro scales numerical modeling, foundation design, and underground tunnel storage.
- o **Uncertainty Quantification and Reliability:** Probabilistic failure analysis, reliability index (β) evaluation, and reliability-informed design under uncertainty.
- o **Surrogate Modeling:** Gaussian process (Kriging) response surfaces for engineering decision-making and sensitivity analysis.
- o **Inverse Modeling:** Parameter identification and model calibration using data-driven techniques.
- o **Optimization and Decision Analysis:** Reliability-based design optimization (RBDO) and trade-off evaluation for complex engineering systems.

- **AI and Data-Driven Modeling:** Machine Learning techniques (Neural Networks), dimensionality reduction (SVD, POD), and probabilistic analysis of engineering failure.
- **Programming:** C, C++, Python, CUDA-C, VBA, and Matlab.
- **Software Applications:** Plaxis 2D, FLAC3D, Etabs, Robot Autodesk, AutoCAD, YADE, and Rockable.

Soft Skills

- **Teaching:** Experienced in delivering undergraduate and graduate-level courses, designing curricula, and creating engaging learning materials. Skilled in simplifying complex concepts and fostering an interactive classroom environment.
- **Writing Proficiency:** Research proposals, scientific papers, and presentations in both English and French.
- **Management:** Supervision of a Ph.D. student and Master's students' internships and have 4 years of experience as a Scout Troop Leader in Lebanon.
- **Interpersonal:** Teamwork, proactive, and diplomatic.
- **Linguistic:** Advanced written and oral skills in English, French and Arabic.

Hobbies

- **Sports:** Football, Basketball, Jogging, Hiking, and Camping.
- **Others:** Reading and Chess.