Jibril B. Coulibaly – ITASCA Minneapolis

Senior Geomechanics Software Engineer II

Expertise

Computational Mechanics, Constitutive Modeling, Soil and Rock Mechanics, Numerical Modeling, Software Development, High Performance Computing

Education

Ph.D. (Civil Engineering), 2017
Université Grenoble-Alpes, Grenoble, France

M.S. (Civil Engineering), 2014
Illinois Institute of Technology, Chicago, IL, USA

B.S. (Civil Engineering), 2014
INSA, Lyon, France

Professional Experience

2026 – Present	ITASCA Minneapolis Senior Geomechanics Software Engineer II
2022 – 2025	Sandia National Labs., Materials and Failure Modeling Dpt., Albuquerque, NM Postdoctoral Researcher
2018 – 2022	Northwestern Univ., Subsurface Opportunities + Innovations Lab, Evanston, IL Postdoctoral Scholar

Project Experience

Constitutive Modeling: Developed the Sel constitutive model for pressure solution creep in crushed salt, an anisotropic viscoplastic formulation capturing reconsolidation of crushed salt into intact salt under general loading and hygrothermal conditions.

Numerical Analysis: Performed meshless (RKPM) simulations of tunnel stability for empty room collapse and reconsolidation for the Waste Isolation Pilot Plant deep geological repository in New Mexico. Conducted DEM analysis of thermo-mechanical couplings in granular materials. Investigated shock dissipation in complex granular media using Bonded Particle Methods.

Software Development: Developed a 3D dynamic engine (C++) for modeling rockfall protection barriers under impact. Implemented super-ellipsoids particles and level-set DEM capabilities in LAMMPS (C++, MPI). Implemented the SANISAND constitutive model with thermo-mechanical coupling in COMSOL Multiphysics (C). Implemented modular hyper-viscoelastic-damage constitutive models for elastomeric syntactic foams in Sierra/SolidMechanics. Developed automated workflows for simulation setup, pre- and post-processing (Bash, Python). Productionize research codes into production software (Git, CMake, gtest, Sphinx documentation).