

# **Innovative Ground Improvement Technology for Sustainable and Eco-friendly Civil Infrastructure Development**

**Professor Mohamed Shahin**

School of Civil & Mechanical Engineering, Curtin University, Perth WA, Australia.

Email:m.shahin@curtin.edu.au

**ABSTRACT:** Unstable soils, characterized by looseness, erodibility, and collapsibility, pose significant engineering challenges due to their low bearing capacity and high compressibility. These problematic soils are widespread and hinder the development of critical civil infrastructure development, including foundations, roads, railways, dams, embankments, tunnels, and retaining walls. To mitigate excessive post-construction deformations and bearing capacity failures, ground improvement is essential. Traditionally, soil stabilization relies on chemical additives such as lime or Portland cement. While effective, these methods have substantial environmental impacts and potential toxicity concerns. This plenary lecture introduces a novel, environmentally sustainable alternative using bio-geotechnical engineering. It explores the fundamental principles and practical applications of this emerging and promising technology in civil infrastructure development. By reducing reliance on chemical stabilizers, this innovative approach has the potential to revolutionize ground improvement practices, offering a more sustainable and eco-friendly solution for future geotechnical engineering challenges.