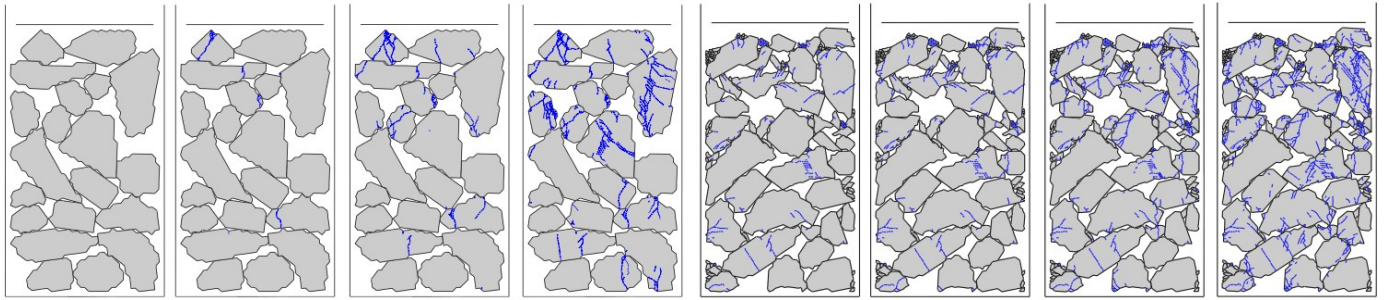


## PhD Position on Performance of granular matrix under heavy haul cyclic loading



The project aims to examine the performance of granular material under repeated (cyclic) loads relevant to road and rail applications. Based on discrete element simulations of spheropolygons, we will extract relevant micromechanical information on cyclic loading dynamics at varied loading frequencies. Two key micromechanical aspects of the discrete simulation are: (1) granular fragmentation and (2) effect of liquid bridges on strength. Stress-strain hysteresis relations and its underlying discrete mechanics will be formulated via averaging strategies. The approach is expected to enhance understanding of the mechanics of highly polydisperse, compacted granular materials under repeated loads for roads and railways.

The PhD candidate will be supervised by Dr Fernando Alonso-Marroquin, an expert in discrete numerical methods, Prof David Airey, expert on characterization of geomaterials for developing novel laboratory and field protocols, and Prof Buddhima Indraratna, who will coordinate the research activities with the industry partners: Infra Tech Pty Ltd, Douglas Partners Pty Ltd, and Road and Maritime Services.

Scholarship will be granted to an exceptional candidate with deep knowledge in programming, mathematics, and geotechnical engineering. The scholarship will cover a generous stipend, funds for establishing international collaborations and to contribute to international conferences, and high-end equipment for numerical simulations.

If you are interested, please contact [fernando.alonso@sydney.edu.au](mailto:fernando.alonso@sydney.edu.au) and provide information about your studies, grade averages, and research record.

