

## 2023 ARMA Future Leader Webinar Series

Every Two Weeks on Fridays 9-10 AM MT



**3<sup>rd</sup> lecture: March 10, 2023**

**Please reach out to [bing.li@uwo.ca](mailto:bing.li@uwo.ca) to get the Zoom meeting information.**

**Speaker: Radhika De Silva**

### **Title & Abstract:**

#### **Non-explosive demolition agents: a new approach for rock mass pre-conditioning**

Conventional mining methods are becoming increasingly uneconomical with declining ore grades. In-Situ Recovery (ISR) of minerals is one alternative technology that can be adapted to liberate minerals from low-grade permeable mineral deposits. ISR susceptibility is dependent on the permeability of the host-rock formation. Although prevailing methods such as hydraulic fracturing and explosive blasting are used for pre-conditioning, these methods have limitations such as excessive formation damage around well fields and uncontrolled fracture propagation. Therefore, an alternative method that complements fluid-based cracking is proposed to initiate fractures around an injection well using a patented hydrophobic, injectable, Soundless Cracking Demolition Agent (SCDA). The fracture performance of the compound was investigated in the laboratory scale, both experimentally and numerically in the 3GDeep research lab at Monash University, Australia. Fracture initiation and propagation during SCDA charging were simulated using the Discrete Element Method. In addition to pre-conditioning for ISR applications, SCDA-based rock fracturing methods show potential in engineering applications such as underground excavations, and underground energy extraction and storage.

### **Biography:**

Radhika is a postdoctoral fellow of the Alexander von Humboldt Foundation, currently affiliated with the Freiberg University of Mining and Technology (TU Freiberg) in Germany. His current work involves the grain-scale simulation of SCDA-charged fracture initiation and propagation in heterogeneous crystalline rock using the discrete element method in collaboration with UIT GmbH, an industry leader in mineral in-situ recovery research. Prior to joining TU Freiberg, he worked as the field technical lead for geotechnical field investigations at Golder Associates (WSP Golder) for a major tunnelling project in Melbourne, Australia and as a post-doctoral research officer at the 3GDeep research lab at Monash University, Melbourne, Australia. He completed his PhD in 2019 and was awarded the Molly Holman Medal (Vice-chancellor's medal) for the best PhD thesis in Engineering at Monash University. In 2022 he won the ROCHA medal awarded by ISRM for the best PhD thesis in Rock Mechanics. He completed his bachelor's degree specialising in Geotechnical Engineering from the University of Ruhuna, Sri Lanka for which he was also awarded the Vice-chancellor's gold medal for the best graduate in 2015.