

# Instrumentation and Slope Monitoring Workshop & InSAR, Radar and Emerging Technologies Workshop

9 & 10 April 2018 | Bespoke Workshop Halls, Barceló Conference Centre | Seville, Spain

The ACG is committed to supporting the development of modern, efficient and profitable mining operations throughout the world. To this end, the ACG presents worldwide training courses and events; the objective of which is to rapidly develop capacity through technology transfer and teaching best practice that enhances mining organisations' profitability and minimises future environmental impacts from their mining operations.

The ACG is delighted to host two, one day workshops to accompany the Slope Stability 2018 Symposium being held in Spain next year. Both workshops, facilitated by Professor Phil Dight, ACG, are focussed on supporting the continued development and application of advanced monitoring systems to all types of mine sites and their waste landforms.

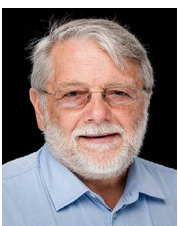
## Instrumentation and Slope Monitoring Workshop

9 April 2018

### Workshop objective:

This workshop will focus on new developments relating to conventional terrestrial monitoring systems such as open pit radars, prisms, laser scanning, photogrammetry, as well as the integration of the different types of these monitoring systems and their interpretation. Application examples of many companies providing these new technologies include land cover determination, feature extraction, persistent change detection and monitoring, terrain slope characterisation, soils modelling and saturated ground detection. Considerable advances have also been made in remote sensing by using a wide variety of different types of unmanned aerial/piloted vehicles (UAVs), commonly known as drones and also referred to as remotely piloted aircraft (RPA), in monitoring mine sites. This workshop will also explore the advances in the in-ground monitoring of deformation and pore pressure in open pit mining that may be able to provide advance notice of ground movement and changes in pore pressure that might affect slope stability.

### Workshop facilitator:



Professor Phil Dight, Professor of Geotechnical Engineering, Australian Centre for Geomechanics

Phil has been involved with the development and design of ground support for mining applications since 1975. Phil joined the ACG in 2008 and has since been working on stress memory effects in rocks, ground support applications, slope stability problems (including the use of microseismicity to understand failure mechanisms), and 3D rock properties.

In 2017, Phil commenced a four year MRIWA project aimed at investigating the issues of strainburst vulnerability in underground mines.

## InSAR, Radar and Emerging Technologies Workshop

10 April 2018

### Workshop objective:

This workshop will focus on the use of remote sensing and the application of emerging types of remote monitoring technology. Remote sensing generally enables infrequent, multi-dimensional long term monitoring capability for wide area coverage both within mine sites and in outlying areas. Radar systems are widely used throughout the mining industry as their primary safety critical monitoring systems and provide close-in, focussed, real time monitoring and alarming capabilities for active mining operations. However, due to the dynamic nature of mining, radar monitoring usually takes place over relatively short term periods. The uses of satellite based synthetic aperture RADAR (SAR), as well as interferometric SAR (InSAR) systems, have been gradually gaining popularity as a tool for geotechnical and environmental monitoring of mines.

See preliminary programmes overleaf!

### ACG Instrumentation and Slope Monitoring Workshop | Monday 9 April 2018

Preliminary programme*	
07:45	REGISTRATION
08:15	Welcome and introduction <i>Professor Phil Dight, Australian Centre for Geomechanics, Australia</i>
08:20	The use of Maptek's laser scanning techniques in geotechnical mapping and slope monitoring at the Kanmantoo Copper Mine, South Australia <i>Bruce Hutchison, Hillgrove Resources, Australia</i>
09:00	Improved interpretation of slope deformation using structural analysis <i>Dr Marc Elmouttie, CSIRO Energy, Australia</i>
09:30	Mastering the moving rock: wireless in-ground slope stability monitoring <i>Dr Eleonora Widzyk-Capehart, AMTC, University of Chile, Chile and Elexon Mining, Australia</i>
10:00	MORNING BREAK
10:30	How new developments in radar technology have helped to improve performances in safety-critical monitoring in open pit mining <i>Niccolo Coli, IDS GeoRadar, Italy</i>
11:00	Holistic approach to slope monitoring using different tools and techniques <i>Albert Cabrejo, GroundProbe Pty Ltd, Australia</i>
11:30	Practical experience of managing multiple monitoring systems in large open pits – what works, what doesn't and improvements <i>Dr Felicia Weir, Pells Sullivan Meynink, Australia</i>
12:00	LUNCH
13:00	Instrumentation and monitoring practices at the Cerro Corona Mine, Peru <i>Peter Andrews, Gold Fields Australia Pty Ltd, Australia</i>
13:30	Measuring coastal instability through integrated time-series terrestrial and airborne laser scanning and photography <i>Dr Neil Slatcher, 3D Laser Mapping Ltd, UK</i>
14:00	Installation of inclinometer casing <i>Rudy Saavedra, Durham Geoslope Indicator, USA</i>
14:30	Integrating satellite data when monitoring instabilities: best practices and real cases <i>Davide Colombo, TRE Altamira s.r.l., Italy</i>
15:00	AFTERNOON BREAK
15:30	Cyclical installation of ShapeArray for deformation monitoring <i>Lee Danisch, Measurand Inc., Canada</i>
16:00	Lessons learned: interesting and unusual case studies <i>Jan de Beer, Reutech Mining, South Africa</i>
16:30	Discussion
17:00	WORKSHOP CLOSE

### ACG InSAR, Radar and Emerging Technologies Workshop | Tuesday 10 April 2018

Preliminary programme*	
08:15	REGISTRATION
08:50	Welcome and introduction <i>Professor Phil Dight, Australian Centre for Geomechanics, Australia</i>
09:00	New emerging radar technologies to extend remote sensing measurements to a wide range of working environments, including underground mining <i>Niccolo Coli, IDS GeoRadar, Italy</i>
09:40	A new device to measure deformation in mines <i>Albert Cabrejo, GroundProbe Pty Ltd, Australia</i>
10:20	MORNING BREAK
10:50	From pit slope to mine asset: multi-scale InSAR intelligence for mine stability monitoring <i>Adam Thomas, CCG NPA Satellite Mapping, UK</i>
11:30	InSAR as a key technology for strategic monitoring <i>Davide Colombo, TRE Altamira s.r.l., Italy</i>
12:10	LUNCH
13:10	Slope monitoring with new radar satellites SENTINEL-1: an opportunity for the mining industry <i>Javier Duro, DARES Technology, Spain</i>
13:50	Operational mine monitoring with InSAR <i>Adrian McCardle, 3v Geomatics inc., Canada</i>
14:30	AFTERNOON BREAK
15:00	On the use of multi-copter drones for landslide investigations on natural and man-made slopes <i>Dr Paolo Farina, Geoapp S.R.L., Italy</i>
15:40	Emerging technologies accelerating smart slope stability <i>Jan de Beer, Reutech Mining, South Africa</i>
16:20	Discussion
17:00	WORKSHOP CLOSE

These ACG open pit mining workshops will accompany the 2018 International Symposium on Slope Stability in Open Pit Mining and Civil Engineering at the XIV International Congress for Energy and Resource Mining in Seville, Spain.

The Symposium will be held from 11 to 13 April 2018.

To register and for more information please visit:  
<http://www.congresomineriasiavilla2018.org/internacional-ingles/ACG-workshop.html>

\* Preliminary programmes are subject to change