



FROM THE DIRECTOR'S DESK

Welcome to the Future! Embracing 21st Century Mining

Wow, so much has happened since the previous Newsletter. Two items are worth mentioning here. First is the work on tackling the 'Missing Miner' problem using Wireless Sensor Networks (WSNs) by Idrees Zaman (visiting PhD candidate from Bremen University) and Godknows Musa (DigiMine researcher) in this area. Second is the significant decision at Wits to move the Centre for Sustainability in Mining and Industry (CSMI) and the Centre for Mechanised Mining Systems (CMMS) into the WMI from January 2018.



The man of the moment, Idrees Zaman, explains the use of Wireless Sensor Networks before the system is demonstrated at WMI.



Highlights

**This is what makes the WMI different:
all our researchers get the opportunity
to work on real-life issues**

FINDING MISSING MINERS

Inspired by what happened at Lily Mine in South Africa, the work on locating and communicating with missing persons in mining has developed from one of our research themes at DigiMine: *working towards reliable, multi-purpose, wireless communication systems for underground mining*. The aim is to position, track and communicate (through voice, data and visual media) with underground mine workers – using the existing WSN network.



Where could the missing miner be? A mock collapse scene is created.



Found him!



At the event were (front from left) Idrees, Prof Anna, Prof Fred and Dr Asad, with some of our delegates standing at the back.

Our partner is the School of Electrical and Information Engineering at Wits, with Drs. Asad Mahmood and Ling Cheng as our experts. On the strength of this partnership, several students are contributing to ongoing research on this theme.

In further collaboration with Professor Anna Foerster at the Sustainable Communication Networks Laboratory (ComNets) at the University of Bremen in Germany, we are conducting the design, development and testing of a technology for tracking trapped miners. A prototype system was developed by Idrees and demonstrated at WMI on 9 November 2017. Because the technology 'taps' into the WSN of a mine, its range is potentially unlimited. WSNs combine through-the-rock, through-broken-earth and through-the-air communication systems and have the potential to re-establish communications through a self-healing process – even in a disaster scenario.

As a proof-of-concept, a collapse scene was created inside the Mock Mine and a network, based on custom-created WSN nodes, was deployed inside and outside the Mock Mine.

Idrees demonstrated that, if the miner node is buried under a pile of debris, the WSN node is still able to transmit signals through the debris, solid rock and through voids, thus informing the rescuers about the position of the missing person.

RESPONSIBLE MINING IS FUTURE MINING

On 1 January 2018, the CSMI became part of the Wits Mining Institute. Launched in 2005, CSMI has an established record of accomplishment of providing accredited training, as well as bespoke and academic research, on priority sustainability issues. As part of the WMI, the CSMI will ensure sustainability and responsible mining are at the heart of the Institute's vision for a 21st century industry.

CSMI is a bridge between practitioners and academia. Our partners are industry, government, organised labour, communities and networks across the globe working to strengthen African mining practice.

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Participants at the first workshop to form the academic and industry partnership for extractives in Dar es Salaam, Tanzania in November 2017 with Acacia, AngloGold Ashanti, the University of Dar es Salaam, Muhimbili University of Health and Allied Sciences and the CSMI. Ingrid Watson, Nancy Coulson and Pontsho Ledwabe from the CSMI attended.



Delegates at a CSMI-Synergy Global CRP training course.



The Parliamentary Portfolio Committee on Mineral Resources visited the WMI on 2 February 2018.



Sibanye-Stillwater's visit to DigiMine in December 2017 l-r: Sarmad Javaid, Changbiao Xin, Mei Yu, Prof Fred Cawood, Peter Turner, Wayne Robinson, Xiang Fan, Godknows Musa and Peter Kalapo

Look out for our next Newsletter, which will cover the amazing launch of the Sibanye-Stillwater Digital Mining Laboratory (DigiMine) in March 2018 and our exciting plans for the CMMS. Until next time, let us spread the good news that 21st century mining is not only responsible – it is smart, safe and exciting!

At the CSMI, we focus on three broad areas:

PEOPLE IN MINING

Here we work in the areas of occupational health and safety, socio-economic development in mining, as well as artisanal and small scale mining.

MINING & THE ENVIRONMENT

Responsible mining requires addressing the degradation of national resources such as water and land, the generation of waste and the potential damage to the ecosystem.

POLICY & REGULATION

In collaboration with relevant experts in other faculties at Wits, our commitment is to strengthen the links between mining policy, regulation and practice. Key focus areas are: mineral policy and investment; mine health and safety; and social and ecological resilience through interdisciplinary innovations, policy implementation and development of best practice.

Social issues are one of the top five business risks in the extractive industry in Africa. CSMI, in partnership with Synergy Global, has since September 2013 been offering courses in community relations practice. The goal is to promote competence and professionalism in the management of company-community relationships in the African extractive sector. The Developing and Maintaining Stakeholder Relations course aims to:

- Equip participants with the knowledge and tools required to better understand and respond to the complex factors shaping stakeholder relations and expectations within the extractive industry, and at their operations in particular.
- Provide participants with the insights, practical skills and tools necessary to develop and maintain productive stakeholder relations.

To conclude, our passion is 21st century mining. We live our passion by building the talent pool of a new generation of graduates embracing responsible mining and technology.

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