School of Mining Engineering celebrates 120 years of service

Currently celebrating 120 years of service to the mining industry, the Wits School of Mining Engineering is the seed from which the University of the Witwatersrand grew, and is now the largest mining school in the English-speaking world. "The School of Mining Engineering is one of the leading schools in the world. Our academics and students, supported by industry, are working together to shape the future of mining on the continent and beyond," said Professor Adam Habib, Wits Vice-Chancellor and Principal.

Professor Cuthbert Musingwini, Head of the Wits School of Mining Engineering.

According to Head of School Professor Cuthbert Musingwini, the growth of the School has taken place alongside a strong commitment to excellence – placing it as number one in Africa and at 22nd position in the recent QS World University ranking of the world's Top 50 minerals and mining schools. Graduates enter the world of work with qualifications that are internationally recognised in terms of the Washington Accord agreement, he said.

In line with Wits University's Vision 2022 strategy, which focuses on making Wits a research-intensive university, the School has boosted its postgraduate numbers to create a growing pool of mining engineering researchers tackling both fundamental and applied research. The School graduated seven doctoral students in 2015 and another five last year.

Graduates of the Wits School of Mining Engineering.

"While most of the research conducted by students up to doctoral level tends to be fundamental research, we have built considerable capacity for applied research through our Centres of Excellence: the Centre for Mechanised Mining Systems, and the Centre for Sustainability in Mining and Industry," said Professor Musingwini. "Leveraging our close links with the private sector – among both mining companies and service providers – we equip these Centres to tackle pressing issues facing the future of mining."

Much of the School's research has already been highly acclaimed in the ways that it has advanced the sector. One of the most memorable intellectual breakthroughs was Wits alumnus Danie Krige's pioneering work applying insights in statistics to the valuation of new gold mines, using a limited number of boreholes. The technique, which became known as 'kriging' after its originator, helped improve ore evaluation techniques and reduced the financial risk of investing in mining projects.

Other contributions include: former senior lecturer Dr Gys Landman's research at Wits which advanced stone-dusting technologies for the coal mining sector; past Head of School Professor Fred Cawood's research into mining tax which helped refine government's mine taxation and royalty formula; Professor Musingwini's research which led to the platinum sector's adoption of the short cross-cut mining method; Professor Halil Yilmaz's research on developing standard testing of thin spray-on liners for supporting mine excavations; and Professor Gordon Smith's research on a strategic planning framework which is being used in some of the platinum mining companies.

To continue this research tradition, the School's staff can boast three full professorships, three associate professorships and four National Research Foundation rated researchers.

"Our competent and committed academic staff have ensured that we maintain firm relationships with the mining sector," said Professor Musingwini. "With the support of the Mining Qualifications Authority and the Minerals Education Trust Fund, we have been able to appoint and retain academics of the highest standard."

The emphasis on research output has meant that output rates have improved markedly in recent years to reach almost 35 research output units in 2016 – making the School a leading research entity in the Faculty of Engineering and the Built Environment at Wits.

Professor Ian Jandrell, Dean of the Faculty, points out that the School has always been seen as a leader in all of its endeavours.

"The School has effectively evolved from a training academy focusing on the very practical needs of an emerging industry, to serving a transforming industry, and to continually engaging in world-leading research," said Professor Jandrell. "It is not surprising that one of the 21st Century institutes hosted by the Faculty is the Wits Mining Institute – a platform built on the acknowledgement of the need for trans- and multi-disciplinary research into mining as we re-imagine this industry and its role in society."

Students receiving instruction in the Digital Mine tunnel at Wits.

The School's contribution to industry is also reflected in the numerous leadership roles that staff play in professional and industry bodies. Professor Musingwini is currently the President of the Southern African Institute of Mining and Metallurgy, an august organisation once headed by the School's Emeritus Professor Dick Stacey, the School's Visiting Professor Nielen van der Merwe, and the School's Honorary Adjunct Professor John Cruise. Professor Cawood is a past President of the Institute of Mine Surveyors of South Africa, and Visiting Professor Christina Dohm chairs the Geostatistical Association of Southern Africa. ■

Gold miners urged to embrace tomorrow's technology

Gold mining can withstand the current headwinds and look forward to many decades of profitability, according to Gold Fields CEO Nick Holland, but only if miners embrace tomorrow's technology, new skill sets and a more inclusive approach.

Speaking at the 120th anniversary celebrations of the School of Mining Engineering, Holland said the workforce on mines of the future would shrink as skills levels and mechanisation rose.

Holland stressed that operating practices and technology would be a vital area in gold mining's new 'recipe for success' – and that universities would be key partners in helping research and develop these technologies. He said mines of the future would focus on digital mining, big data analysis, knowledge production and mining mechanisation.

"The use of drones, advancement in visualisation technologies, remote rock-breaking hydraulic arms and underground sensors on people and equipment are some of the advances which we are piloting at present," he said.

Holland highlighted the technological progress already made in efforts to make more mining more viable and sustainable.

"Mines in Australia have been rolling out new technologies with a significant impact on costs, productivities and safety," he said, "but adoption by the industry has been slow, particularly in developing countries. If mines in other countries want to be sustainable, they will have to follow this course."

He said Gold Fields had set a goal for itself to develop a new, remotely operated underground mine – a prospect has already been identified – within the next three years. This would entail drill-rigs, loaders, trucks and other equipment being operated remotely through a fibre-optic and Wi-Fi environment.

"It may sound like it is light years away, but it isn't," said Holland. "This is a prototype for Gold Fields so that we can learn how to do this properly; it's that close to us."

He said mines also now relied heavily on original equipment manufacturers to help develop the tools of the future. As part of its involvement with the International Council on Mining and Metals – a global group focused on strengthening mines' environmental and social performance – Gold Fields was looking to phase out all its diesel-driven underground equipment in favour of battery-electric power over the next three to five years. The result would include improvements in safety, emissions and ambient temperatures underground. ■