Overview

From the week of 16 January 2017, the University's brand will be refreshed. New elements will be introduced to enhance the brand and increase design flexibility, whilst retaining the brand equity of elements such as the University crest and the yellow brand colour.

Our brand guidelines will be updated to support this change to the University's branding. The full suite of updated branding templates and guidelines will be updated during 2017 and will be made available via myUNSW.

In the interim, please use this Starter Kit as a guide to the brand update. This document is confidential to UNSW staff.

What's changed?

• University name

The University's name will change from 'UNSW Australia' to 'UNSW Sydney' and 'UNSW Canberra'. The name change reinforces the University's city locations in iconic Sydney and our national capital, Canberra.

The first mention of the University in communication must be 'UNSW Sydney'. Subsequent mentions must be 'UNSW'.

If necessary to ensure recognition, the first mention in formal communications may be 'UNSW Sydney (The University of New South Wales). Subsequent mentions must be 'UNSW'.

• Logo

The University logo has been updated to reflect the brand refresh. The University logo is composed of a refined University crest, 'UNSW' type and 'Sydney' location. The portrait version of this logo is the preferred usage.

• Sub-logos

A UNSW Canberra specific logo; composed of the refined University crest, 'UNSW' type and 'Canberra' location is also being introduced. The portrait version of this logo is the preferred usage.

The UNSW Business School logo has been updated, removing the 'Australia' location to reflect the University brand refresh. The landscape version of this logo is the current preferred usage.

The UNSW Global logo has also been updated to incorporate the refined University crest and removal of the 'Australia' location below the crest.

No other versions of the University logo, other than those noted above should be used.
The **UNSW School of Mining Engineering** is Australia’s leading mining engineering educational institution – with a proud history and dynamic forward vision for mining education. We are the largest provider of mining engineers, through our undergraduate program, supported and endorsed by the Minerals Council of Australia (MCA). This support comes through involvement in a unique national education partnership – Mining Education Australia (MEA), where we work collaboratively with the other three major mining universities in Australia. This ensures both the relevance and high academic standards of our program which delivers “globally-aware” mining engineers with technical and management skills, together with appropriate social, cultural and community awareness.

UNSW also offers the largest and broadest range of postgraduate mining engineering coursework programs in Australia. One of the attractive drawcards of the programs are the flexible delivery options that include short course block mode learning and an increasing number of 100% distance-delivery courses, the latter being particularly attractive to students in remote locations across Australia and internationally.

We work closely with the mining industry, ensuring strong industry involvement in our courses, support for our students through scholarship programs, and collaboration on industry relevant research projects.

**Message from the Head of School**

UNSW Mining Engineering is one of the largest mining schools in the world, with close links to industry and governments, leading to excellent research and producing high-calibre graduates.

Associate Professor Paul Hagan
Head, School of Mining Engineering

**Associate Professor Paul Hagan**

**Head, School of Mining Engineering**

p.hagan@unsw.edu.au
What do we do?

Courses
UNSW Mining Engineering provides more undergraduate and postgraduate mining professionals than any other organisation in Australia. Our undergraduate program provides the essential qualification to become a professional mining engineer. The program is endorsed by both Engineers Australia and the Australasian Institute of Mining and Metallurgy. All postgraduate short course programs are delivered in block or distance mode to suit the needs of people in industry wishing to upgrade their knowledge and qualifications.

We offer:

- Bachelor of Engineering Honours (Mining Engineering) (3707) and a range of combined mining degrees with science, arts, law, commerce and civil engineering.
- Graduate Certificate of Mining Engineering (7335)
- Graduate Diploma of Mining Engineering (5335)
- Graduate Diploma of Mine Geotechnical Engineering (8059)
- Graduate Diploma in Mine Ventilation (5046)
- Masters of Mining Engineering (8335) (Mine Management or Mining Geomechanics)
- Masters of Mine Geotechnical Engineering (8059)
- Research degrees at both Masters and PhD level
- Customised professional development programs for both local and international partners

State of the Art Teaching
Academic staff in the School are internationally recognised for their contributions to the field, across a diverse range of topics from mine geology through mine planning and operations to mineral processing and sustainability.

UNSW Mining Engineering maintains close links with domestic and international companies. Industry professionals are actively involved in our teaching programs to ensure graduates have the requisite skills, knowledge and attributes that will make them industry-ready.

The School boasts excellent facilities, including impressive computer labs and a custom-built, state of the art, 3D virtual reality simulator.

Scholarships
There are a range of scholarships available to students who are interested in studying at UNSW. Some of these scholarships are exclusive to the School of Mining Engineering and are generously sponsored by our industry partners. For more details visit scholarships.unsw.edu.au
Research & Innovation

The School is a powerhouse of practical engineering research. The importance we place on the transfer of our research into practice cannot be overstated. One of the major ways we do this is through working in deep and mutually beneficial industry partnerships in which there is increasing emphasis under the UNSW 2025 Strategy with a focus on:

- Academic Excellence
- Social Engagement
- Global Impact

We offer the opportunity of solving increasingly complex problems by building project teams through collaboration with other engineering and science disciplines - possible at a world-class and highly ranked research intensive university.

Research strengths

We provide innovative solutions to technically complex challenges, particularly in the areas of mining geomechanics, sustainable mining practices, and mining systems and mineral processing.

Mining Geomechanics

Our mining geomechanics experts focus on improving mine safety and productivity through fundamental research in rock mechanics as well as applying the findings to issues facing the industry. Key areas of expertise include:

- Ground control – including pillar design, ground support design, rock mass classification, rock burst, coal burst, and advanced risk based designs in underground and open cut mines;
- Developing and improving ground support technologies;
- Advanced visualisation – through the use of virtual reality technology as a tool for a systems approach to understanding big data in application, such as mine seismicity;
- Mine subsidence behaviour and prediction; and
- Numerical modelling.

Current main research projects include fundamental coal burst research; avoiding premature cable bolt failure; investigating cable bolt performance under a range of geotechnical conditions; mine subsidence behaviour and prediction; highwall mining pillar design; estimating rock mass strength from laboratory properties; and probabilistic analysis of slope stability.

Sustainable mining practices

Sustainable mining practices are of central importance to the long-term health of the industry and much of the School’s research is conducted through, or in association with, the Australian Centre for Sustainable Mining Practices (ACSMP) based at UNSW. Key areas of expertise include:

- Mine site water, groundwater and seepage barriers in association with the UNSW Global Water Institute;
- Remote sensing to detect environmental impacts, subsidence and illegal mining through the Laboratory for Imaging the Mining Environment (LIME); and
- Climate change adaptation and mining, and carbon management.

Our academics have recently published ground-breaking research on barriers to groundwater flow near mines and are undertaking an evaluation of geotechnical mechanisms in valley subsidence and mine closure.

Mining systems and mineral processing

This research area focuses on improving efficiencies in mining systems and mineral processing through novel techniques, technology developments and new approaches. This field spans:

- Froth flotation as a mineral separation technique;
- Longwall top coal caving;
- Block cave mining; and
- Off-Earth Mining on asteroids, Mars and the Moon
- Rock excavation including blasting and rock cutting.

Current research being undertaken includes flotation froth behaviour and bubble stability, improvements in dust measurement and assessment, explosives material evaluation, and the development of an integrated economics model for in-situ resource use to support a colony on Mars.

“My vision is to continue the great work that is ongoing and focus future efforts in areas that not only develop best-practices in cooperation with Australian miners, but also work towards sharing this knowledge with nations interested in moving their own mineral sectors forward on a sustainable pathway.”

Associate Professor Michael Hitch, Director ACSMP

We partner with over 50 organisations and have in excess of 35 PhD candidates, ensuring our research is current, relevant and of world-class quality.
CASE STUDY 1
Supportive partnership to raise the roof

Partners: Jennmar Australia, Whitehaven Coal, Glencore Coal, Anglo American Metallurgical Coal, Centennial Coal.

Type of partnership: Australian Research Council (ARC) Linkage Project

Purpose: Avoid catastrophic failure of rockbolts in underground coal mines.

Funding: The total value of the project was approximately $1.5M, comprising $465K cash ($285K from Australia Research Council) and over $1.05M in-kind support from the five partner companies

Outcomes: 1: Conducting a world-first comprehensive study of catastrophic rockbolt failure
2: Constructing a world-class controlled mine environment laboratory
3: Generating expertise of world renown in the area of stress corrosion cracking in ground support systems.

CASE STUDY 2
Advancing aquitard assessments for energy and mineral resource projects

Purpose: Advance the knowledge base on aquitards and engineered groundwater barriers to improve the safety of mining operations and minimise the environmental footprint.

Next Steps: Further funds have been awarded to continue related research. The UNSW-based Australian Centre for Sustainable Mining Practices is now seeking new industry partners to test different types of flow barriers on mine sites.

Funding: $3.4 million from the Australian Research Council through the National Centre for Groundwater Research and Training.

Outcomes: A comprehensive framework to undertake aquitard assessments – including fieldwork, laboratory and modelling studies

CASE STUDY 3
Froth flotation advances for improved mineral processing

Research partner: Newcastle University

Purpose: Generate new knowledge on the fundamental processes that control the stability of foams and emulsions for more efficient applications for various industries including mineral processing, food and oil industries.

Funding: $315K - Australian Research Council Discovery Grant

Outcomes: The ability to directly observe, manipulate and control particle-stabilised bubbles and droplets
The Virtual Reality Simulator

The provision of quality education is at the heart of the School of Mining Engineering and, given this passion, we are extremely proud of our Virtual Reality Simulator (VR Simulator). Developed for student use and industry training it consists of floor-to-ceiling screens and casts 360 degree, 3D images with cinematic clarity. Staggeringly realistic underground mines and scenarios are available for exploration within this facility that steps beyond the boundaries of traditional education, into experiential learning.

Sensing a significant opportunity for training and feasibility testing, our industry partners have driven the development of the VR Simulator for nearly a decade and it offers a range of modules from open-cut to underground, and across all mining sectors.

Within the safe confines of a 3D simulation, potential hazards can be safely experienced, evacuation procedures tested, and feasibility studies consolidated resulting in a cost-effective, low risk, high-impact learning experience.

Real-time technology allows split-second decisions to directly affect the outcome of a myriad of possible scenarios. The potential for learning – through these consultative real-time processes – means that theories can be tested via intuitive technology, and ideas safely challenged within a constantly unfolding framework.

Of those graduating in 2014 with a Bachelor of Mining Engineering (honours) 24% were female (up from 6% in 2000).
Some of our partners

- BHP Billiton
- Centennial Coal
- CMOC Northparkes Mines
- Glencore Coal
- Jennmar Australia
- Mitsubishi
- NASA and the Jet Propulsion Laboratory
- Peabody Energy
- Rio Tinto
- South 32

Awards and accolades in 2015

- Best Student Thesis: Engineers Australia
- Best Paper Award: 13th International Society for Rock Mechanics Congress in Montreal, Canada
- Best poster award: Australian Groundwater Conference 2015

Industry sponsored Chairs

The School is grateful to our industry partners for the support of industry sponsored chair positions. These senior positions are held by mining engineering academics who have a strong research reputation in their area of expertise.

- Mitsubishi Chair in Sustainable Mining Practices – Associate Professor Michael Hitch
- Chair of Mine Geotechnical Engineering – Professor Fidelis Suorineni
- Kenneth Finlay Chair in Rock Mechanics – Professor Ismet Canbulat
- Chair in Mining Engineering - Professor Bruce Hebblewhite

Annual Keynote Lectures & Events

- Mitsubishi Minerals Sustainability Lecture held in May
- Kenneth Finlay Leadership & Culture in Minerals Industry Lecture held in September
- UNSW Mining Summer School for senior High School students in January
- UNSW Open Day held in September

I've always had a passion for learning which is why I decided to undertake postgraduate study. The graduate diploma in Mine Ventilation is industry focused – and it's integrated with what you do in the workplace. It's enabled me to become more specialised and the position I'm in now is one I wouldn't have been in without postgraduate study.

Braedon Smith – Mining Engineering Graduate and current Postgraduate student
Contact Us

Undergraduate & General Enquiries
T 61 2 9385 5006
E mining@unsw.edu.au

Postgraduate Enquiries
T 61 2 9385 5346
E postgrad.mining@unsw.edu.au

Research Enquiries
T +61 2 9385 4525
E research.mining@unsw.edu.au

Australian Centre for Sustainable Mining Practices
T 61 2 9385 6830
E acsmp@unsw.edu.au

LinkedIn
UNSWMiningAlumni

Facebook
UNSWMiningEngineering

Twitter
@UNSW_Mining