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UQ PRESIDENT AND VICE-CHANCELLOR’S REPORT

In introducing this 2015 annual report of The University of Queensland’s Sustainable Minerals Institute, I would like to first congratulate all SMI staff, students, advisory board members and industry partners, who have demonstrated a capacity to not only respond to change, but also to lead it.

By recognising that a scheduled review of the Institute was timely and presented opportunities, you were able to use the panel’s advice to inform decisions about the organisation’s direction. These decisions were strategic, but at times difficult. Your resulting actions have helped fortify SMI against future external shocks, and placed the institute in a better position to work with the sector to promote sustainable and responsible practices. This will in turn improve the prospects of communities which have fortunes intertwined with the global minerals industry.

It is a mark of foresight that, during tough times, the SMI and many industry and government partners continued to invest in the long term, and innovate. Indeed both SMI and JKTech have for some years epitomised qualities that our Federal and Queensland governments are now championing as must-haves for a nation adjusting to the new economic realities. Importantly, the Institute and partners have demonstrated that well-designed collaborations between researchers and businesses have mutual benefits, as well as benefits for wider society.

The University of Queensland recognises that, in order to attract and hold outstanding industry partners, we must continually provide evidence that UQ is extremely good at what we do. SMI produced many fine examples of research excellence in 2015, including Dr Antony van der Ent, who received a Discovery Early Career Research Award from the Australian Research Council, and Dr Laura Sonter who was lead author on a paper published in Nature Climate Change. The paper, regarding carbon emissions from the Brazilian steel industry, was a collaboration with CSIRO and the Federal University of Minas Gerais in Brazil; one of the co-authors was SMI’s current director, Professor Chris Moran.

SMI has also been working at the edge of innovation in professional and postgraduate education, by teaming up with UQx. UQx, which specialises in Massive Open Online Courses (MOOCs), and the Centre for Social Responsibility in Mining (UQ-CSRM) developed video resources in English and Spanish, which were first delivered by SMI-CSRM at a workshop in Peru, and have since been translated into French and used in Madagascar.
This represents an efficient, targeted mode of delivery of UQ’s global top-50 expertise to resource operations and professionals, including the many located in remote regions. The SMI is now building internal capacity to design and deliver online programs that can be packaged with onsite teaching, lead into postgraduate studies, or foster professional development.

I have a view that the old academic adage ‘publish or perish’ must be supplemented with ‘partner, deliver and prosper’. Although ‘prosperity’ is not a word freely associated with the resources sector in recent times, I see that the SMI exemplifies the new maxim. Because nerve has been held during a challenging era, SMI is better equipped to offer solutions to challenges that confront global society - even as change continues at warp speed.
SMI ADVISORY BOARD’S REPORT

In his report, Professor Chris Moran has described the “Next SMI” initiative that the Sustainable Minerals Institutes leadership team has been pursuing for well over a year to re-position SMI for a rapidly changing industry environment.

The focused strategy that has emerged is based on key identified, relevant, programs of applied research and innovation in the global mineral resources sector, a stronger emphasis on industry and other stakeholder engagement, and an ongoing commitment to education and learning within SMI as an institute increasingly integrated with other related parts of UQ.

In recent times there seems to have been an overwhelming focus by the minerals industry on drastic cost reductions in response to the sustained collapses in commodity prices. However, important sustainability issues remain for the industry, along with a pressing need for major productivity and efficiency enhancements. We believe that the importance of these factors will continue to drive the collaborative commitments to well-targeted applied research, and the Next SMI strategy is intended to provide a compelling value proposition for SMI’s existing and new partners in delivering exciting, innovative solutions to these issues.

The change process at SMI has been demanding on the leadership team, the staff and students of SMI, and I echo Chris’ thanks for the involvement and commitment that these people have made over the past year to position us so well for further success. I would also like to extend my thanks to the Executive of UQ, to my colleagues on the SMI Advisory Board and to the members of the other Centre advisory boards who have generously given their time and expertise to support SMI’s leadership team over the past year.

Finally, and as a post script to the 2015 report, on behalf of the SMI Advisory Board I would like to extend my sincere thanks to Chris Moran with his mid-2016 departure from SMI and UQ. Chris led the reshaping and transformation of SMI into the recognised global leader in applied research in sustainability in the mining industry. In more recent years he has also courageously led the organisation through a series of necessary, major organisational and strategic changes. He has made such an important contribution to the success of SMI, and deserves our formal acknowledgment and thanks for that. As a result of the efforts of Chris and the SMI leadership team, the organisation is now very well positioned to confidently embark on the implementation of a refreshed, compelling strategy.
The year 2015 will go down as one of enormous change for SMI as we positioned ourselves to meet the challenge of a rapidly changing resource sector by focusing on thriving, not surviving.

The external environment in which we operate has undergone significant change in the past two years. The majority of our industry partners have gone through radical change in terms of structure, personnel and priorities.

As a highly engaged research institute, SMI recognises and is responding to these changes in our environment. SMI is responding through a change process we are calling Next SMI. Next SMI includes some internal changes as well as important strategic activities to ensure we are working closely with our industry partners and stakeholders and positioned to offer strong value propositions for the next renewal phase.

During this time of significant change we are very pleased to be continuing to work with our industry partners on projects and research that are helping to improve efficiencies and sustainability in the mining and minerals sector.

Our leadership team has worked in consultation with industry partners and stakeholders to transform the Institute from being a successful, large applied research and education Institute, into a mature, collaborative and resilient organisation that meets the industry downturn head on and thrives as a result.

Some of the major changes we have enacted have been the grouping of our Centres to better encourage synergies and cross collaboration. While the Centres still exist, they have now been grouped together to reflect their general research focus:

**People Centres** - Centre for Social Responsibility in Mining, Minerals Industry Safety & Health Centre

**Environment Centres** - Centre for Mined Land Rehabilitation, Centre for Water in the Minerals Industry

**Production Centres** - WH Bryan Mining & Geology Research Centre, Julius Kruttschnitt Mineral Research Centre

Within these groupings we have identified areas of particular research focus that will be coordinated by our leading people. Our programs of research will focus on the following areas:
People Centres
Community and Workplace Health and Safety, led by Professor David Cliff
Development and Governance, led by Professor Saleem Ali
Extractives and Communities, led by Associate Professor Deanna Kemp

Environment Centres
Ecological Engineering of Soil-Plant Systems, led by Associate Professor Longbin Huang
Ecosystem Assessment, Restoration and Resilience, led by Dr Peter Erskine
Life Cycles of Mines and Metals, led by Dr Glen Corder
Regional Water and Land Resources, led by Professor Neil McIntyre

Production Centres
Geology for Mining (leader TBC)
Mass Underground Mining, led by Professor Gideon Chitombo
Next Gen Mine-to-Concentrator, led by Professor Sarma Kanchibotla
Processing: Prediction of Process Performance, led by Dr Kym Runge
Rock: Ore Processability, led by Professor Malcolm Powell

SMI is positioning itself to be the “go to” Institute for minerals industry innovation, research and education. We have recognised, and are responding to, the contraction of the mining and minerals sector by further extending our engagement with the resources sector and driving a culture of innovation to provide great ideas leading to tangible improvements in mining practices and approaches. I see SMI being renowned for delivering timely solutions and value to our industry partners and stakeholders and part of this was to more clearly define our programs of work, both within our Centres and across disciplines.

I would like to make special mention of the support we have received from UQ’s Provost, Professor Max Lu and Chair of the SMI Advisory Board, Mr Charlie Sartain. Without their belief and backing of our vision, and that of the UQ Executive and our Advisory Boards, none of this would have been possible.

I close my report by thanking the staff and students of SMI. It has been a period of upheaval and uncertainty for many of our people, but I believe in 2016 we will start to reap the benefits of the hard work and sacrifice they have made to set up SMI for a bright future.
NEXT SMI

As part of The University of Queensland’s (UQ) septennial cycle of reviews of academic units, the Sustainable Minerals Institute (SMI) underwent its second formal review in September 2014 with SMIs staff and students invited to participate in the preparation of the Institute’s submission.

The Review Panel provided its written report including 23 recommendations. The valuable messages received and interpreted from the review contributed to the SMI embarking on the planning of an important process of change – we have termed this “Next SMI”. Next SMI laid out some high level activity sets to be actioned during 2015. A Project Implementation Group was formed and the underlying principles and high level activities of Next SMI were formed into a detailed implementation plan identifying the key activities and engagement opportunities for the first half of 2015. To guide SMI on the change journey, Dr Leonie Horrigan, from People and Performance Consulting, was engaged to provide project and change management expertise.

A number of workshops were held with the Senior Leadership Group of SMI, as well as all SMI staff and students, with the purpose being to explore and discuss a number of topics around the future of the Institute.

In June 2015, as part of the Next SMI leadership structure changes, Professor David Cliff, Professor Neil McIntyre and Professor Saleem Ali took the opportunity to strengthen their research and education involvement in SMI by taking on Program Leader roles while Professor Margie Scott, former Director of SMI-BRC, made the decision to leave SMI to pursue other opportunities.

Professor David Mulligan took on the role of Director of Environment Centres (SMI-CMLR and SMI-CWIMI); Professor David Brereton became the Director of People Centres (SMI-CSRM and SMI-MISHC) and Professor Ben Adair took on the role of Director of Production Centres (SMI-JKMRC and SMI-BRC), thus forming a reduced and rebadged SMI Senior Leadership Team.

SMI’s Senior Leadership Team then facilitated a process to determine the Institutes future Programs of Work with the aim being to balance the need to provide SMI staff and students with some certainty, while making sure that Programs of Work reflected both our capabilities and the opportunities and interests of our stakeholders and sponsors.

SMI staff and students were invited to participate in a workshop within their Centres to identify that Centre’s growth plan. This information was used by a group that participated in the Positioning for Growth Workshop on 25 and 26 June. This Growth Workshop focused on identifying a viable growth strategy for Centres, Centre Pairs, and SMI as a whole.

A small group of the participants from the Growth Workshop took the material created from the Workshop and in consultation with staff and students generated a consolidated capability plan for SMI. The Capability Document was a foundation for conversations with Sponsors and Stakeholders and was also an excellent resource for SMI to understand the strengths and skills of the Institute.
From August through to mid-September 2015, Directors of Centres worked with staff and students to identify sponsors and stakeholders to enable a coordinated and thorough approach to connecting with them to meet their immediate, medium and longer-term needs. It was critical to test SMI’s capabilities with our sponsors and stakeholders to ensure that our capabilities were appropriately aligned to industry’s interests, needs and opportunities.

In early September 2015, Professor Ben Adair left SMI to lead the second stage of CRC ORE as Managing Director and Chief Executive Officer. Professor Alice Clark, former President of the Australian Institute of Mining and Metallurgy (AusIMM), joined SMI as the Director of Production Centres (SMI-JKMRC and SMI-BRC).

An Advisory Board Jamboree was held on 17 September, where members of Centre Advisory Boards and the SMI Advisory Board attended a workshop-style event to provide additional feedback about the Institute’s capabilities and potential opportunities available to SMI.

From mid-September, the Senior Leadership Team used the information gathered from SMI’s sponsors and stakeholders as well as the capability information to determine SMI’s Programs of Work.

In parallel to this process, significant work was undertaken on the development of a project management framework and a financial model to support the work of SMI going forward. A principle of Next SMI was to create a transparent financial model that best uses the flows of funds through the university, to progress the Institute’s strategic aims and to enable the most effective management of project funds at the local level.

In early October, a professional staff structure consultation document was circulated to all staff within SMI. The changes proposed within the document affected the structure of professional support services and proposed a reduction in professional support positions. A number of open sessions were held for staff and students to discuss the document. High-level feedback and an implementation process were circulated to staff and students following the consultation period with career transition and resiliency workshops offered to all SMI staff and students.
Programs of Work and their respective Program Leaders were announced in December 2015.

- **Environment**
  - Ecological Engineering of Soil-Plant Systems Led by A/Prof. Longbin Huang
  - Ecosystem Assessment, Restoration and Resilience Led by Dr Peter Eckine
  - Life Cycles of Mines and Metals Led by Dr Glen Corder
  - Regional Water and Land Resources Led by Professor Neil McIntyre

- **People**
  - Community and Workplace Health and Safety Led by Professor David Cliff
  - Development and Governance Led by Professor Saleem Ali
  - Extractives and Communities Led by Associate Professor Deanna Kemp

- **Production**
  - Geology for Mining Leader TBC
  - Mass Underground Mining Led by Professor Gideon Chitombo
  - Next Gen Mine-to-Concentrator Led by Professor Sarma Kanchibotla
  - Processing: Prediction of Process Performance Led by Dr Kym Runge
  - Rock: Ore Processability Led by Professor Malcolm Powell

In 2016 work will continue on finalising SMI’s Strategic Plan 2016-2020; formalisation of a Business Development and Engagement Strategy; the implementation of SMI’s new Project Lifecycle project management methodology; embedding of the abovementioned Programs of Work and implementation of the centralised model of professional services.
SMI LEADERSHIP

Professor Chris Moran
Director
Sustainable Minerals Institute

Professor Ben Adair
Director Production Centres (Jan – Sep 2015)

Professor David Brereton
Director People Centres

Victoria Anderson
Deputy Director — Operations
Sustainable Minerals Institute

Professor Alice Clark
Director Production Centres (Sep – Dec 2015)

Professor David Mulligan
Director Environment Centres
2015 Report

It continues to be a challenging environment for the resources sector, many industry experts have remained committed to sharing their knowledge and expertise to improve mine site health and safety through research.

MISHC staff have continued their deployment widely across the globe. Danellie Lynas focused her attention on the health and safety of artisanal miners and their communities in Ghana and Papua New Guinea. Associate Professor Carmel Bofinger travelled to Suva as part of a United Nations Development Program aid program to improve the health and safety of quarry and stone miners. The International Mining for Development Centre (IM4DC) funded occupational health and safety research and training had Professor David Cliff visiting Peru to deliver a course on occupational health and safety in conjunction with the University of Western Australia leadership experts.

The novel method of using iOS devices to measure whole body vibration (WBV) developed by Professor Robin Burgess-Limerick has been deployed to several Australian coal mines allowing large datasets of WBV to be collected across a range of equipment. Ms Lynas has been active in carrying out the field studies at surface and underground mines. This project has been funded by Australian Coal Association Research Program (ACARP) and the Coal Services Health and Safety Trust. Professor Burgess-Limerick is also evaluating proximity detection interfaces using a haul truck simulator, funded by ACARP.

Professor Burgess-Limerick continues his research partnership with the National Institute for Occupational Safety and Health (USA), analysing mining fatalities using Bow Tie techniques, and preparing human centred design best practice case-studies in conjunction with Professor Horberry (Monash University).

MISHC is exploring the future of risk management research and education in partnership with UQRisk! led by Associate Professor Maureen Hassall.

Professor Cliff provided expert testimony to the Linc Energy Inquiry in Dalby, Queensland.

Professor Cliff co-chaired the 3rd International Conference on Mine Geology Safety and the Environment in Xi’an China, hosted by the Xi’an University of Science and Technology, College of Geology and the Environment, in November 2015.

He also attended the 36th International Conference of Safety in Mines Research Institutes, an event enabling discussion on the challenges and achievements in the field of mines safety and disaster management, that was held in Sudbury, Ontario, from October 25 to 27, 2015 and presented two papers.
The Global Minerals Industry Risk Management program risk management training courses continue to be well attended and have been updated to include the latest thinking on critical controls and control effectiveness.

MISHC was commissioned by the Department of Industry, Innovation and Science, to develop a Leading Practice in Sustainable Development Handbook on Community Health and Safety. The bulk of the work was carried out by Dr Jill Harris with support from Associate Professor Carmel Bofinger.

Professor Cliff managed the completion of two major ACARP funded research projects – one on the potential impacts of lightning on underground coal mines and the other a rewrite and update on the textbook on spontaneous combustion in underground coal mines.

The final phase of the ACARP RISKGATE project has been initiated with the review of the current topic areas. The Alpha Foundation RISKGATE model project lead by Virginia Technical University has been completed. Mr Philipp Kirsch and Dr Jill Harris were heavily involved in both these projects.
BRC is an applied research centre which continues to build on its existing reputation for practical innovation in mass mining and a demonstrated global leadership in deep mine development and operation. The Centre is focused on industrial research solutions for active and future mines and has a mandate to advance total deposit knowledge (ore and waste; geological and geotechnical).

2015 Report

SMI-BRC Adjunct Professor and Board member Dan Wood was recognised with the Order of Australia in 2015 Australia Day awards. Mr Wood was honoured for his distinguished service to the mining and resource industry, particularly mineral exploration, through contributions as a geologist, academic and in executive roles.

Professor Gideon Chitombo sat on a panel discussion at the Austmine 2015: Transforming Mining on 19-20 May 2015. Other panelists included Chairmen and senior people of Northparkes, Austmine and Mine Site Technologies.

In September 2015 Professor Alice Clark took on the role of the Director of Production Centres, providing leadership across SMI-BRC and SMI-JKMRC. In 2015, Professor Clark was honoured with the Australasian Institute of Mining and Metallurgy (AusIMM) Beryl Jacka Award in recognition of extraordinary and sustained service to the AusIMM.

SMI-BRC was a sponsor of the 2015 Society of Economic Geologists (SEG) Conference held on 27-30 September in Hobart, Tasmania. The theme of the conference was ‘World-Class Deposits: Discovery to Recovery’. The Conference included key presentations from industry and research leaders from across the world on the geology and discovery of world-class ore deposits, through to the recovery of metals. SMI-BRC organised and chaired two sessions on the key theme of Mining Geology.

In December 2015 Dr Tony Webster was elected as the Chair of the Queensland Division of the Geological Society of Australia. He has also been elected as one of three new members of the AusIMM Geoscience Society Committee for the period 2016-2018.

STUDENTS

In March Zhenyu Han was awarded the SMI RHD Student Travel Award, to attend the 13th International Congress on Rock Mechanics in Montreal, Canada in May 2015. The following month, Zhenyu was a recipient of the SMI RHD Student Research Support Scholarship. Another BRC recipient of the SMI RHD Student Travel Award was Kwasi Ampofo, who attended the 19th Annual International Conference ‘Real Options: Theory Meets Practice’, in Athens, Greece in June 2015. In December Matthias Klawitter was awarded the SMI RHD Student Award: Spirited Award for demonstrating initiative, perseverance and the ability to overcome significant obstacles on the path to attaining his degree.
**APPLIED GEOLOGY PROGRAM**

**Deep Mining Queensland Project (DMQ):** The project commenced in April 2015 with funding from the Geological Survey of Queensland (DNRM) and in-kind support from Chinova Resources through access to data and logistical, and site support. The aim of the DMQ project is to reduce the risk profile of exploring at depth in the Cloncurry terrane (Mt Isa Inlier).

**Geology and Mass Mining Project (GMM):** The project has been ongoing since 2012 and is currently in the final phase of completion. The technical report was delivered to industry sponsors and government in November 2015. Some work is still in progress to finalise strategy for technology transfer though workshops and courses. Work also continues on finalising the numerical modelling work to help quantify some of the qualitative conclusions on the impact of geology on cave propagation.

**Improved Blast Outcomes By Integrating Structural And Blast Modelling Project:** This two year project was funded by ACARP. A sophisticated, but easy to use, blast design and analysis tool have been developed to combine BRC’s blast energy distribution and Fragmentation software with CSIRO structural modelling software. The aim is to deliver more accurate predictions of blast performance in heterogeneous rock.

**Metamove Project:** Over a number of years, the JKMRC and BRC have been working on several blast modelling techniques to predict muckpile movement and shape. MetaMove, as implemented for metalliferous mines, is the most recent version. New features include Buffered Blasting; Grade Distribution; Vector Definition; Fitch Emulation; and Calibration.

**DEEP MASS MINING PROGRAM**

**Next Generation Cave Mining Phase 1 Project (NGCM1):** This project served as a consultation process with sponsors and provided a pathway for the new Cave Mining 2040 initiative that Professor Gideon Chitombo is developing. A Draft Industry Brief on Cave Mining has been prepared and distributed to the industry for comment. The Cave Mining Collaboration Consortium (Cave Mining 2040) marks the start of a series of development activities needed to transform the cave mining industry. The intent is to start the first series of Cave Mining 2040 project in October 2016, with the intention for the project to span over a number of years.

**Effective Mining for Future Deep Deposit Project:** In May 2015 BRC was awarded a SMI Category 1 Collaborative Grant Scheme for Professor Gideon Chitombo and Dr Ruslan Puscasu’s project titled Effective Mining for Future Deep Deposit. The research project aims to make significant advances in the understanding the fundamentals of rock mass response to mining at depths greater than past and current experience. The ultimate purpose of the research is to enable the effective mining of future deep ore bodies that otherwise would not be mined economically and safely using current methods.
2015 Report

2015 saw a number of significant changes for the SMI-JKMRC. These changes reflected the difficulties faced by the minerals industry and were coupled with the outcomes of the SMI review and Next SMI. Efforts to position the JKMRC and broader SMI resulted in the non-renewal of several research and professional staff positions.

Dr Chris Fountain continued as acting director until August when Professor Ben Adair took over as acting Director of Production Centres. In September 2015 Professor Adair left the SMI to take up the role of Director of CRC Ore. At that time Professor Alice Clark was appointed Director of Production Centres.

Research progressed on several major projects, including the current extension of the P9 project and the Anglo American Centre for Sustainable Comminution. Work proposals were prepared for a number of new projects including the next phase of the P9 project. However, it was recognised that the likelihood of securing funding for many new projects was remote given the continuing slump in the mining sector.

Notable achievements during the year included JKMRC's founding director Alban Lynch publishing a Comminution Handbook, which was launched by AusIMM at the MetPlant Conference, held in Perth. Present and former JKMRC staff and students were major contributors: Bianca Foggiatto with Marcos Bueno contributed to Chapter 12 on Milling Circuit Calculations as well as to Chapter 16, entitled "Circuit Design", which includes basic guidelines for appropriate process development and comminution flow sheet selection. In addition, detailed procedures for selecting and sizing comminution equipment are provided. Co-authors of this chapter included: Eddie McLean, Greg Lane and Chris Morley. Dr Cathy Evans provided Chapter 2 on Mineral Liberation. Former student and staff member Steve Morrell contributed to Chapter 4 Ore Comminution Measurement Techniques. Former student and staff member Walter Valery contributed to Chapter 11 Comminution circuits for Ores, Cement and Coal. Diana Drinkwater of JKTech was a member of the Steering Committee and many of the reviewers were past and present JK staff. Overall a strong contribution to a book useful to students and to practitioners.

JKMRC won funding for a new Mineral Liberation Analyser (MLA) through the 2015 UQ Major Equipment and Infrastructure & 2014 NHMRC Equipment Grant scheme. The funding allowed the JKMRC to purchase an FEI Quanta 600 Mk2 MLA with SDD detectors which has later generation, faster hardware than our current systems. This will enable continuation of service of this essential tool for use in research and teaching and to also provide additional measurement capacity. The faster measurement times will also provide greater opportunities for under-
graduate and postgraduate students to benefit from hands-on access to a system. JKMRC is internationally recognised for the development of the MLA, an automated mineralogical characterisation tool based on a Scanning Electron Microscope (SEM) platform. Since its development in the late 1990s and commercialisation by FEI Company the MLA has gone on to become a mature technology that is routinely used to quantify ore mineral characteristics in both research environments and in industrial applications.

A delegation of Turkish Government mining officials visited JKMRC mid-year. The delegates were given presentations about SMI, MISHC, JKTech and CRC Ore as well as a tour of the facilities. The group also visited UQ’s School of Mining and Mechanical Engineering.

SMI’s work in Turkey was featured in UQ’s Alumni magazine Contact. The article focuses on JKMRC’s RHD student Baris Yildrim as well as SMI’s work with Turkey’s newly established International Mining Centre.

JKMRC welcomed back one of its first students to present a special seminar titled: From Thesis to Thesis. Fifty-three years ago David Moore was a foundation postgraduate student, supervised by Professor Alban Lynch, in the inaugural Mineral Processing research project, which became a highly successful long-term core project for the JKMRC. He completed his thesis, A Mathematical Analysis of Mineral Breakage, in 1964 and soon after he entered Oxford University as the Queensland Rhodes scholar. After he retired in 2009 following a diverse career in the minerals industry he embarked upon a very different second PhD through Swinburne University of Technology. Fifty years after his first thesis he submitted Three Queensland Premiers and the Mungana Scandal, focusing on the Chillagoe-Mungana story which holds a unique place in Queensland’s mining and political history. The presentation, From Thesis to Thesis, firstly contrasts David Moore’s unusual experiences with both theses. It then uses conclusions from the second thesis as a reminder of the major impact of cycles in the minerals industry and the unusual situation the industry now faces.

Dr Jeffrey Dawes, a former JKMRC PhD student who now heads up Komatsu Latin America, presented a special seminar event at JKMRC in October.

The JKMRC Students Technical Presentation 2015 was successfully held in October in the JKMRC Lecture Theatre. Nineteen postgraduate students presented their thesis topics in mineral processing with a focus on mining, comminution and flotation. The seminar, organised by the JKMRC students, was a full day program and was well-attended by the alumni, staff, external visitors and students.

During the year, three students were awarded MPhil degrees for their research theses, and a further five were awarded PhDs.

Bianca Foggiatto received the 26th lan Morley prize awarded for the two best theses in Geosciences and in Mining or Extractive Metallurgy in Queensland. The presentation was attended by several past recipients of the award.

The JKMRC hosted a METS Ignited event in December. METS Ignited is an industry led government funded initiative aiming to strengthen Australia’s position in mining innovation. Guests included the Lord Mayor of Brisbane, Cr Graham Quirk, senior government officials and industry leaders.
2015 Report

In 2015, CWiMI has continued to participate in developing guidelines for national and international best practice in water management. Neil McIntyre represents SMI on the Department of Industry's panel overseeing the revision of the Leading Practice Sustainable Development Program guides for the mining industry, and co-authored the new water management guide. Greg Keir is leading CWiMI's continuing work with Minerals Council of Australia (MCA) members and the International Council on Mining and Metals (ICMM) to provide expert advice on water accounting and footprint metrics.

The CSRM-led project “Managing the impacts of minerals development on women and men and their traditional livelihoods in Mongolia” was successfully completed in 2015 with a series of workshops in Mongolia to launch the handbook “Responsible Mining in Mongolia: Enhancing Positive Engagement”. CWiMI staff contributed the water management chapter of the handbook and participated in the workshops.

CWiMI marked the end of the International Mining for Development Centre (IM4DC) by publishing a paper on lessons learnt about water capacity building needs, in collaboration with the University of Western Australia. The paper “Water management capacity building to support rapidly developing mining economies” was published in the Water Policy journal.

Staff continue to publish in top international journals. A major publication success arose from the research conducted by Dr Laura Sonter, a former RHD student with CWiMI, which was published by Nature Climate Change. Her co-authors include Professor Chris Moran, Damian Barrett (formerly from CWiMI and now at CSIRO), and Britaldo Soares-Filho (from UFMG in Brazil). The paper describes how Brazilian steel industry strategies to reduce carbon dioxide emissions have failed spectacularly, actually resulting in a doubling of emissions.

South America continues as the main focus for international collaboration. CWiMI staff have undertaken three engagement and project development trips to Chile in 2015. Sue Vink and Greg Keir spoke at the Water Week Latin America 2015 conference as part of a delegation of Australian researchers and industry representatives. The UQ delegation also hosted a well-received workshop on ‘Water for security and development: addressing the water-energy and food nexus’, featuring a keynote address from Sue Vink.

Neil McIntyre spent two weeks in Chile as a member of the Scientific Advisory Board of the Water Resources Centre of Excellence led by the University of Concepción, and establishing support from Codelco and Anglo American for projects under the SMI-ICE-Chile. Neil McIntyre travelled to Bogota, Colombia.
where he was joined by CSRM researcher Diana Arbelaez-Ruiz to take part in a workshop at Los Andes University aiming to establish a new partnership starting with six collaborative research projects in 2016. Sue Vink was part of the UQ delegation to Argentina and Uruguay to establish new business and collaboration opportunities there.

CWIMI appointed a new Research Manager, Ian Callow, to lead industry engagement, funded partly by strategic support from UQ, in view of the increasing recognition of the importance of good practice water management in the mining industry. Ian has focused on engaging with potential partners in Queensland. Natasha Danoucaras, a long-standing member of SMI, left CWIMI to follow other opportunities within UQ. Following the departure of Dr Lucy Reading at the end of 2014, Dr Sven Arnold joined CWIMI from CMLR to lead the Groundwater Recharge research areas. Dr Jason Dunlop of the Queensland Government’s DSITIA has joined as an Adjunct Academic.

International consultant KCB has established a new partnership with CWIMI and CMLR to increase engagement and knowledge exchange between practitioners and researchers in particular on tailings water management. The first stage in the partnership will be research into long-term changes in hydrogeochemical behaviour of tailings.

CWIMI’s major research effort continues to be in associated with UQ’s Centre for Coal Seam Gas (CCSG), with CWIMI leading three water related projects: Recharge estimation in the Surat Basin, Characterisation of current groundwater uses in the Surat and Bowen Basins, and Water Chemistry Atlas. These projects are in their second stages and will continue into 2016. In November, five CWIMI staff presented current groundwater research at the biennial Australian Groundwater Conference held in Canberra, Australia’s premier groundwater conference. Greg Keir, Alexandra Wollhuter, Sue Vink, Neil McIntyre and Nena Bulovic presented research from the three CCSG funded projects.

CWIMI continues to grow its international academic collaborations. In 2015, Professor Howard Wheater from The University of Saskatchewan visited to discuss collaborative research proposals on basin scale water resources, and Dr Bethanna Jackson from the University of Victoria, Wellington visited to establish joint research into land use planning tools. Ian Callow was invited to an international workshop in Columbia University, New York, to maintain our engagement with the Columbia Water Centre, and Neil McIntyre was invited to speak at Columbia’s Water in Mining workshop in Santiago. CWIMI continues to collaborate with Witwatersrand University in South Africa, with a 2-year project on water footprinting starting late in 2015. Neil McIntyre spent one week at Imperial College London in his Visiting Professor capacity.

CWIMI increased in numbers during 2015 due to the arrival of five new RHD students: Sholto Maud, Warren Finch, Celso Isidro, Juan Ossa Moreno and Shirley Shi. RHD students who completed their research were Vinitha Nanjappa, Ruolin Wu and Angela Werner.
CSRM works with industry, communities and governments to improve social performance and deliver better outcomes for all mining stakeholders. CSRM has developed a unique team of anthropologists, sociologists, economists, natural resource specialists, political scientists, systems engineers and technical specialists who are committed to bridging the divide between technical, physical and social sciences.

2015 Report

2015 was a year of consolidation and redefinition of our core competencies, given the industry downturn as well as a major decline in Australian Commonwealth funding for research. We have streamlined our program delivery according to needs priorities within the funding environment. The Centre has developed two programs that are now part of the new SMI structure in the areas of Development and Governance; and Extractives and Communities

This year, we turned our attention to European Development donors and were successful in getting three major grants from the German Development Agency (GIZ). Our ongoing work on the efficacy of certification systems in the extractive industries with the Tiffany & Co. Foundation helped in securing confidence for these funds.

We were able to renew our engagement with Vale Corporation’s Malaysia operation to manage and monitor the social investment of their operations. This project is an ongoing partnership with UQ International Development and positions us well in the field of socioeconomic diagnosis of infrastructure projects and their community development planning.

Numerous other industry engagement projects continued, including through the production of Rio Tinto’s Why Agreements Matter guide, the fourth in the series. CSRM also conducted an independent third party review of the Porgera Joint Venture’s pilot resettlement project, which included an historical review and an opinion of the ‘do-ability’ of the resettlement project itself. CSRM’s Mining, Resettlement and Livelihoods initiative has continued, with collaborative research funds again being provided by Newcrest, Rio Tinto, Anglo American and Newmont Mining. This initiative aims to build knowledge and capacity in the involuntary resettlement and livelihood restoration arena. One of the major activities was a global study of resettlement practitioners, the results of which will be released in 2015.

We completed a landmark study on infrastructure corridors in Indonesia under the Australian Indonesian Infrastructure Research Award (AIIRA). This has allowed us to extend our expertise in socio-ecological toolkit development using Geographic Information Systems (GIS). Our publication record continued to show positive development with Professor Saleem Ali publishing a new co-authored book Environmental Diplomacy (with MIT’s Larry Susskind, Oxford University Press) and an anthology Diplomacy on Ice (coedited with Rebecca Pincus, Yale University Press).
Associate Professor Deanna Kemp won the SMI award for most rapid rise in research publications for a second year in a row. Doctoral student activity continues to flourish with three doctoral graduates in 2015 with excellent job placements. Thus despite the challenges in funding, CSRM continues to reinvent itself to remain a high quality competitive research centre.
2015 Report

2015 was a challenging year given the industry downturn and trend to reduce the level and longevity of investment in environmental research. However, from a research output and impact perspective, the CMLR continued to excel. Through identifying and investing in new opportunities and innovations, the Centre has created strengths and capabilities that meet the research needs required to ensure future recovery and sustainability of disturbed land.

There were two new projects linked to mine closure launched in 2015 that use the CMLR’s capabilities in remote sensing and image capture and analysis. The first is developing a set of process tools using remote sensing technology to understand the risk associated with fire to rehabilitation and to assess the expected recovery response. The second uses converged monitoring involving the concurrent collection and analysis of spatially-explicit field-based assessments and remote sensing to provide comprehensive datasets. These datasets can be assessed with high confidence in overall accuracy and risk capture. The factors being assessed in this latter study include pyritic oxidation of waste rock and the change in surfaces due to slumping, batter slope erosion and stability, native vegetation establishment and growth, and the spread (and hence approaches to the control) of weeds.

With the signing of the UQ-MMG research collaboration agreement, the CMLR commenced developing a program of work that focuses on the building of robust mine waste management and monitoring protocols to reduce uncertainty as a part of the closure strategy for the Century Mine.

The CMLR was awarded two new ACARP projects for commencement in 2016, the first a collaborative project with CWIMI on the “Prediction of long-term salt generation from coal spoils” and the second a project to develop “A rigorous framework package for change detection in complex vegetation communities”, jointly with the Auckland University of Technology and Buckinghamshire New University in the UK.

In collaboration with Professor Neil McIntyre from CWIMI, Dr Mansour Edraki led the Centre’s CORFO-funded activities through SMI-ICE-Chile and worked closely with colleagues at La Universidad de Concepción on developing programs of tailings and water research at Codelco’s El Teniente and Chuquicamata copper mines.
Relationships with the Université de Lorraine (UL) in France and Sabah Parks in Malaysia were strengthened through the work program and expanding developments in the phytomining area led by Dr Antony van der Ent and Dr Peter Erskine. The UL collaboration has provided access to EU funds that contributed to the support of both Antony van Ent in 2015 but also PhD students working in the area. Research projects at Eramet’s Weda Bay nickel operations in Indonesia and copper operations in northern Zambia led to the discovery of new metal tolerant and hyperaccumulator plant species.

New international MoU agreements were finalised with the Geological Survey of Finland (GTK) and Tadulako University in Central Sulawesi, Indonesia, and a delegation from the Land Consolidation and Rehabilitation Centre, Chinese Ministry of Land and Resources, led by the Vice Minister, the Honorable Mr Zhang Delin, visited SMI and signed a 5-year renewal of the MoU.

CMLR’s China engagement continued to be active in 2015 through Assoc. Prof. Longbin Huang’s networks and collaborators in academe, research organisations, government and industry and a number of visits were undertaken to develop new opportunities. The Centre remains an attractive research destination for Chinese students and staff with many funded by the Chinese Scholarship Council. German and French students supported by their national government schemes also continued to be a feature of CMLR’s research diversity in 2015.

Building from the relationship initiated with an MoU signing with the Korea Institute of Geoscience and Mineral Resources (KIGAM) in 2014, Dr Mansour Edraki hosted a Korean delegation that included collaborators from KIGAM, the Green Technology Centre and various companies. This relationship building led to a research project during the year and the invitation for partnership in a 5-year collaborative multi-national project.

With the support of the Australian Government through Austrade, the CMLR was invited to deliver a workshop in Vietnam to assist government agencies develop a sustainable mining development policy and leading practices framework. CMLR staff also convened and delivered workshops at venues including the European Geosciences Union in Vienna and the Spatial Ecology and Conservation Conference in Birmingham and presented numerous other papers at conferences around the world.

In 2015 the CMLR co-chaired the 4th International Enviromine Conference in Lima, Peru, and commenced planning for the 3rd Life-of-Mine conference co-hosted with AusIMM to be held in Brisbane in 2016.

As a part of the contribution to the International Mining for Development Centre program, and building from the program that commenced in 2014, the CMLR again hosted 21 participants from 12 developing countries for a month-long course on Environmental Management in Mining.

One of CMLR’s 2014 PhD graduates, Dr Bronwen Forsyth was awarded the “Dean’s Award for Outstanding Research Higher Degree Theses”. Among the acknowledgements awarded to current PhD students, Tamar Cohen was rewarded with a Berndt Research Foundation Postgraduate Scholarship that supports research focusing on Aboriginal Australia, and Amelia Hine and Miguel Alvarado both received support for their research from Japan Coal Development Australia.
(JCDA). Two students also commenced on fully-funded industry scholarships during the year - Bevan Emmerton with support from ACARP and Phill McKenna with support from the Coal Minesite Rehabilitation Trust Fund.

Another of CMLR’s 2014 PhD graduates, Dr Antony van der Ent was awarded an ARC Discovery Early Career Researcher Award (DECRA) commencing in 2016 to unravel the ways in which metal hyperaccumulator plants work. The Global Hyperaccumulator Database hosted by CMLR went live in 2015, as did the CMLR Online Herbarium.

The CMLR’s impact through research publications and the progress and quality of the work conducted by research higher degree students during the year made 2015 another year of academic success and we were delighted to welcome another 5 PhD graduates to the Centre’s alumni.
The International Mining for Development Centre (IM4DC) supported developing nations to transform their extractive resource endowments into inclusive and sustainable economic and social development. The IM4DC was established as a joint venture between The University of Queensland and The University of Western Australia, the Centre was funded by the Australian Government through an Australian Aid initiative administered by the Department of Foreign Affairs and Trade. The IM4DC was established as a joint venture between The University of Queensland and The University of Western Australia and The University of Queensland in October 2011, and was funded by the Australian Government through an Australian Aid initiative administered by the Department of Foreign Affairs and Trade.

### 2015 Report

The International Mining for Development Centre was the $31 million centrepiece of the Australian Government’s $127 million Mining for Development Initiative.

After almost four years of intensive activity coordinated by the IM4DC partners The University of Queensland and The University of Western Australia, the Centre completed its program on 30 June 2015, comfortably exceeding most of the targets set in the Centre’s Grant Agreement with Department of Foreign Affairs and Trade (DFAT). Following an administrative wind-down and reporting phase, the IM4DC Board and Management presented the final program report to DFAT in September in Canberra, meeting all commitments and closing accounts with a $70k surplus and no significant outstanding issues.

The Centre’s purpose was to engage, develop and empower individuals and partners in resource-rich developing countries to transform their extractive resource endowment into inclusive and sustainable economic growth and social development. The integrated program of activities was designed to leverage Australia’s global footprint of mining experience and capability.

During the life of the program, IM4DC supported over 2,700 participants from almost 800 different institutions in 65 countries across the Asia-Pacific, Africa and Latin America. Program activities showcased Australia’s expertise in resource governance, with over 300 delivery partners including universities, government and industry bodies, NGOs, mining and services companies engaged in activities. This collaboration delivered 105 short courses and workshops, 90 research and institutional capacity building projects, and supported 27 fellowships. More than 1,800 alumni are now registered with the unique M4DLink on-line community of practice, and the alumni network will continue to be supported by both University partners and the Australian Government until August 2016.

The outcomes built by the program form the foundation for the higher level transformational change envisaged by IM4DC. Evaluations of alumni impact were commissioned in 2014 and 2015, focusing on the experience of participants in implementing change following their initial engagement in the program. The research confirmed that there was clear evidence that participants have developed leadership capability, and initiated innovative activities and changes in their own contexts. A substantial amount of change was reported at the organisational level and beyond, suggesting positive and broad impact being created across the alumni’s work environment.
In the absence of a continued integrated DFAT program in this space, UQ and UWA have agreed to continue to work together under the banner of the Minerals and Energy for Development Alliance (MEfDA). The continued support of the alumni network has been implemented under this banner, and a number of other activities have been supported through other funding avenues. The flagship ‘Emerging Leaders in African Mining’ program, which was delivered by IM4DC for two years alongside the African Mining Indaba conference in Cape Town, was recently repeated using funds provided by the African Minerals Development Centre and the UNDP Development Minerals Programme. A number of other SMI research and education activities have benefited from the contacts made during the IM4DC program, and we will continue to develop these linkages in an area of significant importance to the global minerals industry and the Australian Government.
SMI-ICE-CHILE

With the foundations laid in 2015, 2016 will see SMI-ICE-Chile progressively achieve its objectives of fundamentally improving the productivity and environmental signatures of Chilean mining operations by creating a new collaborative global mining knowledge force in Chile that builds human capital, provides innovative research outcomes and realises effective technology transfer to industry.

The following activities, carried out in 2015, have placed SMI-ICE-Chile in a strong position to capitalise on the investment made by CORFO and the Chilean mining industry:

- Recruitment of the SMI-ICE-Chile Director;
- Focusing on engaging with industry;
- Realigning activities in response to CORFO requirements in terms of the “industrial ecosystem”. This included a focus on engagement with supplier networks within Chile;
- The assessment and sanctioning of seed projects in line with the three Research and Development lines.

Seed projects, developed in consultation with industry, include:

- Tailings and Water – Diagnosis of Issues and Identification of Potential Points of Intervention;
- Spectral Characterization and Image Analysis in Phases and Reaction of Interest in Copper Pyrometallurgy for the Design of New Sensors for Process Control;
- Development of Protocol Procedures to Detect the Critical Blending Restrictions in Order to Optimize the Flotation Process of Low Copper Grade Ores; and
- Design and Implementation of an On-Line Rheometer for Mineral Slurries
- Frother Roles Characterization in a Laboratory Mechanical Cell.

SMI-ICE-Chile must respond to a set of significant challenges facing the Chilean mining industry. SMI-ICE-Chile aims to make a significant and lasting contribution to address one or all of these issues over the course of its initial eight-year life.

The primary tasks for SMI-ICE-Chile in 2016 is to embed the organisation in the mining industry innovation landscape by establishing a physical office in Chile, recruiting administrative staff for the office in Santiago, implementing the governance structure, continuing to gather industry support and funding, building on the seed projects already underway, commencing capability and knowledge transfer activities and developing a communication plan.
TECHNOLOGY TRANSFER AND COMMERCIALISATION

JKTech delivers economic and social value to the global resources industry via innovative technology products and services. Our expertise in technology based consulting, laboratory services, software, specialist equipment and professional development, is implemented to improve the profitability, sustainability, and safety culture of resource operations across the globe.

In response to suppressed activity in the global resources industry, JKTech restructured its business model in 2015. The cornerstone of its revised approach is to maintain a core group of people who are the real assets of our company, and who retain the knowledge, expertise and wide range of industry experience in minerals-related disciplines.

Despite the challenging market conditions, JKTech and SMI continued to collaborate strategically and operationally to deliver world-class capability that is aligned with The University of Queensland’s core purposes of Learning, Discovery and Engagement.

During 2015, JKTech’s operations continued throughout the world, with activities undertaken in South America, Africa, the Middle East, Asia, and of course Australia. In the second half of 2015, JKTech participated in a successful trade-mission to Kazakhstan, which led to follow on business development opportunities in Russia.

JKTech’s consulting arm, which encompasses mining and processing specialists in the areas of ore fragmentation, ore pre-concentration, comminution circuit optimisation, retreatment of waste streams, continued to have a profound impact on the operations of our clients. For a large gold producing client, the clients senior management team acknowledged that JKTech successfully increased gold production by approximately 25% in the 1st phase of work at two operating sites without the need for capital investment.

Our processing and mining specialists played integral roles in Rio Tinto’s Processing and Mining Excellence Centre’s that were announced in 2014, through the immersion of two full-time resources for a period of six months whilst the Centre’s were established.

JKTech continues to capitalise on our long history in software development, and has signed up as a participant with the Australian federal government CRCORE based in Brisbane. JKTech will play an integral role in the development and commercialisation of CRCORE’s IES product.

JKTech’s Chilean subsidiary (JKTech South America SpA) continued to play an integral role in the establishment and management of the SMI led International Centre of Excellence in Chile. The Centre has been founded following the
The successful award of grant funding from InnovaChile Corfo (‘CORFO’). The Centre’s objective is to carry out research and development, technology transfer and commercialisation activities that will have a high national and international impact for Chile, and that strengthen Chile’s research and development capabilities.

In January 2015, Ok Tedi Mining Limited (OTML) and JKTech entered into a strategic partnership agreement to train and develop the OTML workforce.

The foundational pillar of the partnership was the “Ok Tedi Way”, which included the translation of the OTML vision, mission, and values into a transformational lever to embed change, and support integrated operational performance at OTML as a result of training and education. JKTech and SMI staff delivered the operational and leadership programs on-site at the mine in Papua New Guinea.

JKTech and SMI commenced collaboration on the NextWorkforce Research & Innovation project, which is a research and innovation program focused on human capital innovation in the global resources sector. The project team plans to bring together a global consortium of resource companies, governments, and donors who are committed to developing the human capital of the global resources sector, with a view to creating financial returns and shared value for companies, communities and nations alike.

We understand that the resources industry remains strategically important for The University’s industry engagement programme, so as one of UQ’s two commercialisation companies, JKTech will continue to work with SMI researchers and industry alike, to identify the best commercialisation pathways for thought-leading, cutting edge breakthroughs as well as enhancements to processes, technologies and methodologies for the global resources industry.
STUDENTS

Research Higher Degree Graduates

Education programs offered through SMI are recognised internationally for their rigorousness and relevance for mining professionals. In 2015, 21 SMI Research Higher Degree students graduated, with 18 PhD and 3 MPhil being awarded.

Dr Snezana Bajic, PhD, JKMRC, Characterization of the liberation kernel

Dr Janina Beyer, PhD, CWiMI, Microbial Communities in an Ephemeral Stream System and the Implications of Saline Mine Discharge

Dr Alex Catalan, PhD, BRC, Implementation and assessment of intensive preconditioning for cave mining applications

Dr Xumeng Chen, PhD, JKMRC, The effect of regrinding chemistry and particle breakage mechanisms on subsequent cleaner flotation

Dr Tristan Cooke, PhD, MISHC, Human Factors Methods to Design Safer Mobile Mining Equipment

Dr Anand Datar, PhD, CMLR, Quantification of landform heterogeneity and its relationship with ecological patterns in broad-scale post-mine rehabilitation

Dr Ruth Fuller, PhD, MISHC, The impact of non-technical issues on decision-making by coal mining incident management teams

Dr Mirella Gavidia, PhD, CSRM, Exploring the dynamics of fairness in the relationships between mining companies and affected communities: A case in the Brazilian Amazon

Dr Geordan Graetz, PhD, CSRM, Uranium Companies and Traditional Owners: Negotiating the intersection of risk and rights

Dr Gerardo Castillo Guzman, PhD, CSRM, Transforming Andean Space: Local experiences of mining development in Peru

Dr Imad Haidar, PhD, BRC, Multi-step forecasts of complex dynamical systems using soft-computing tools, with application to crude oil returns
Dr Garry Marling, PhD, MISHC, *Optimising risk management team processes*

Mr Carl Masuret, MPhil, JKMRC, *Developing an abrasion characterisation test for measuring superficial breakage in comminution*

Mr Daniel Mitchell, MPhil, JKMRC, *Improved relationships for discharge in SAG/AG mills*

Ms Vinitha Nanjappa, MPhil, CWiMI, *Influence of calcium proportion on the toxicity of a saline solution to Ephemeroptera Austrophlebioides sp. AV1*

Dr Yuni Rusdinar, PhD, CMLR, *Geochemical Processes Controlling the Distribution and Long Term Stability of Heavy Metals in Mine Tailings Deposited in Rivers; the case study of ModADA, Papua, Indonesia*

Dr Qi Shao, PhD, CMLR, *Surface Hydrological Modelling for Rehabilitated Landforms*

Dr Ruolin Wu, PhD, CWiMI, *Understanding salt transport in the hyporheic zone of ephemeral streams*

Dr Mingrui Yuan, PhD, CMLR, *Role of organic and inorganic amendments in aggregation of base metal mine tailings*

Dr Fang You, PhD, CMLR, *Rehabilitation of Organic Carbon and Microbial Community Structure and Functions in Cu-Pb-Zn Mine Tailings for in situ Engineering Technosols*

Dr Weiran Zuo, PhD, JKMRC, *A study of the applications and modelling of high voltage pulse comminution for mineral ores*

**STUDENT AWARDS**

**Ian Morley Award 2015**

The 26th Ian Morley prize was awarded to Bianca Foggiatto. The Ian Morley prize is greatly valued by JKMRC students, and acknowledges the best overall performance by an RHD student, not only in their research work, but in their contributions to the cultural life of the JKMRC.

**SMI Research Higher Degree Conference**

Carlos Espejel (JKMRC) won the award for best presentation, and Rebekah Ramsay (CSRM) won both the runner up for best presentation and the people’s choice award.

**SMI 3 Minute Thesis**

Philippa Dodshon was the winner of the 2015 SMI 3MT competition with her presentation “What’s the definition of insanity?” The two runners up were Erica Avelar with “The Gold Baker” and Ceit Wilson with “Steering Social Outcomes in Energy Resource Communities”.

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**The University of Queensland**

**SMI Sustainable Minerals Institute**
AWARDS

RISKGATE honoured with ACARP Excellence Award

RISKGATE, an online risk management system designed by researchers from SMI’s Minerals Industry Safety & Health Centre, was recognised in Brisbane on September 17 at the 2015 ACARP Research and Industry Excellence Awards. The ACARP awards are given to people who have advanced an area of importance to the Australian coal industry. An important criteria is the likelihood of the results from the project being applied on mines.

Vice-Chancellor’s Alumni Excellence Award

Dr Jeffrey Dawes, a former JKMRC PhD student who now heads up Komatsu Latin America, was honoured by The University of Queensland with a Vice-Chancellor’s Alumni Excellence Award. Dr Dawes, whose 1987 thesis looked at the study of blast performance and design through the analysis of ground vibrations, has occupied increasingly senior positions with several companies during his career. These positions have culminated in his appointment as President and CEO of Komatsu Latin America where he is responsible for the Komatsu owned distributors in Latin America, as well as the Komatsu regional entity.

Australia Day Awards

BRC Adjunct Professor and Board member Dan Wood was recognised with the Order of Australia in 2015 Australia Day awards. Mr Wood was honoured for his distinguished service to the mining and resource industry, particularly mineral exploration, through contributions as a geologist, academic and in executive roles.

JKMRC’s original international student honoured

JKMRC’s first international student, and third ever graduate, Professor TC Rao, who is also known as the ‘father of Indian mineral processing’, was honoured with the Award for Outstanding Achievement in Science & Technology at the 2015 Australian Alumni Excellence Awards – India.
PROFESSIONAL SERVICE

Associate Professor Thomas Baumgartl
Applied Clay Science, Editorial Board
International Soil and Water Conservation Research, Editorial Board Member
Soil and Tillage Research, Editorial Advisory Board
European Journal of Soil Science, Associate Editor
Environmental Geochemistry and Health, Associate Editor
Soils, Editorial Board

Professor Robin Burgess-Limerick
Applied Ergonomics, Editorial Board
Ergonomics Open Journal, Editorial Advisory Board
International Ergonomics Association, Mining Technical Committee Chair
International Ergonomics Association Melbourne 2015 Congress, Organising Committee Member

Professor Gideon Chitombo
Innovative Technologies and Concepts for the Intelligent Deep Mine of the Future, Advisory Board Member
Networks of Centres of Excellence on Ultra Deep Mining Network, Expert Panel Member

Professor David Cliff
Australian Occupational Health and Safety Education Accreditation Board, Academic Representative
National Research Council Board on Human Systems Integration’s Mine Safety: Essential Components of Self-Escape, Member
OHSc Program Advisory, Committee Member
Queensland Underground Coal Mines, Organising Committee Member for level one emergency simulation exercises
Safety in Mines Testing and Research Station Advisory Board, External Board Member
Technical Steering Committee for the Coal Mining Abatement Technology Support Program, Alternate Member
Advisory Group for Coal Workers Health Scheme, Independent chairman
Dr Glen Corder
IChemE in Australia Board, Technical Policy Director
AusIMM Community and Environment Society, Committee Member
AusIMM Continuing Professional Development, Committee Member

Dr Jo-Anne Everingham
Australian Evaluation Society (member)
International Association of Impact Assessment (member)
International Rural Sociology Association (member)

Dr Mansour Edraki
Organising committee, Australian Acid and Metalliferous Drainage Workshops, Chair

Associate Professor Longbin Huang
Asia Pacific Biochar Conference 2016, Oct 19-23, 2016, Gangwon Province, Korea, Co-chairperson
Key Research Laboratory, Land Consolidation and Rehabilitation Centre, Ministry of Land and Resources, China, Member of Academy Committee

Associate Professor Deanna Kemp
Expert Panel for the International Council of Mining and Metals New Member Review Process, Member
Advisory Board, Institute of Human Rights and Business (IHRB), Member
Journal of Impact Assessment and Project Appraisal, Editorial Board Member
Journal of Corporate Social Responsibility and Environmental Management, Editorial Board Member
Journal of Development Studies Research, Editorial Board Member
Journal of Extractive Industries and Society, Editorial Board Member

Professor Chris Moran
Journal for Cleaner Production, Subject Editor: Sustainability in the Resources Sector
Centre for International Minerals and Energy Law Advisory Board, Member

Professor David Mulligan
Alligator Rivers Region Technical Committee, Independent Member
Bathurst Resources Escarpment Mine, New Zealand, Independent Peer Review Panel Member
International Affiliation of Land Reclamationists, Australian representative
Fourth International Seminar on Environmental Issues in Mining (Enviromine), Lima, Peru 2015, Co-chair Life-of-Mine International Conference, Brisbane, Australia 2016, Organising Committee Chair
First International Congress on Planning for Closure of Mining Operations, Santiago, Chile 2016, Co-chair
Greening Australia, Advisory Councillor

Associate Professor Barry Noller

Professor Malcolm Powell
Australian Institute of Mining and Metallurgy, Fellow
South African Institute of Mining and Metallurgy, Fellow

Associate Professor Will Rifkin
Commonwealth Office of Learning and Teaching, National Assessor for Teaching Awards
Science and Mathematics Network of Australian University Educators, Steering Committee Member
University of Sydney, School of Physics, Honorary Associate Professor
Rural Sociology Journal, Editorial board
Professor Margaretha Scott
Australian Institute of Mining and Metallurgy, Member
International Symposium on Mineral Exploration, Division of Exploration Technology in Mining and Materials Processing Institute of Japan, Organising Committee Member
Queensland Exploration Council, Academic Working Group – Member
Society of Economic Geologists, Member

Professor Jim Underschultz
Australian National Low Emissions Coal, Research and Development Science Leader
International Standards Carbon Capture and Storage Committee, Working Group Member
Standards Australia Carbon Capture and Storage Mirror Committee, Member
The Peter Cook Centre for Carbon Capture and Storage Research (University of Melbourne) Science Advisory Committee, Member
Geotechnical Reference Group for the CTCSo Surat CCS Project, Chair

Corinne Unger
AusIMM Community and Environment Society, Immediate Past Chair
AusIMM Board of Chartered Professionals, Board Member

Associate Professor Sue Vink
Coal Seam Gas water use proposals in the Queensland Murray-Darling Basin: Impacts on aquatic ecosystems, Steering Committee Member
Fitzroy Basin Association Partnership for River Health Science Panel, Member
Healthy Headwater Coal Seam Gas Water Feasibility Study, Advisor
Queensland Resources Council Water Group, Science Advisor
Water in Mining Conference, Organising Committee Member

Dr Tony Webster
AusIMM Heritage Committee, Corresponding Member
Australian Journal of Earth Sciences, Associate Editor Queensland
Division of the Geological Society of Australia, Chair Geoscience
Society Committee of the AusIMM, Member

The Reverend Professor Rodney Wolff
Applied Stochastic Models in Business and Industry, Editorial Board
Computational Statistics, Editorial Board


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Julius Kruttschnitt Mineral Research Centre


SMI MISHC
Minerals Industry Safety & Health Centre


Chair: Charlie Sartain, Sartain Enterprises
Professor Chris Moran, The University of Queensland
Professor Max Lu, The University of Queensland
Mike Oswell, Anglo American
Donovan Waller, Anglo American
Frans Knox, BHP Billiton Mitsubishi Alliance
Blair Sands, Newcrest Mining
Ken Ramsey, Newmont Asia Pacific
Paul Dowd, Resources and Engineering Skills Alliance
James Purtil, QLD Dept of Natural Resources and Mines
Warrick Ranson, Rio Tinto
Michael Wright, Thiess
Dr Geoff Gault, JK Tech P/L

Chair: Don McKee
Professor Alice Clark, The University of Queensland
Professor Chris Moran, The University of Queensland
Brian Hall, AMC Consultants
Alexander Campbell, Ernest Henry Mining
Miles Johnston, MMG Ltd
Brad John, Geological Survey of Queensland
Dan Wood, Highlands Pacific Group
Colin Moorhead, Newcrest Mining
Peter Forrestal, Glencore

Chair: Peter Roe
Professor David Mulligan, The University of Queensland
Professor Chris Moran, The University of Queensland
Mary-Anne Crawford, Centennial Coal
Peter Smith, Environment Action
Mike Slight, Mike Slight and Associates
Suzanne Davis-Hall, Klohn Crippen Berger
Ross Browning, Downer EDI Mining
Peter Eaglen, Rio Tinto
Paul Smith, Sibelco Australia
Michael Looker, The Nature Conservancy
Pieter Swart, Glencore
Chair: Christine Charles
Professor David Brereton, The University of Queensland
Professor Chris Moran, The University of Queensland
Professor Ove Hoegh-Guldberg, The University of Queensland
Professor David Trigger, The University of Queensland
Ruth Link, The Kuwul Group
Ramanie Kumanayagam, BG Group
Ron Brew, Newcrest Mining
Serena Lillywhite, Oxfam Australia
Murray Swyripa, Rio Tinto
Lisa Pollard, QLD Dept of State Development, Infrastructure and Planning
Frances Hayter, Queensland Resources Council

Chair: Kristina Ringwood, Environmental Resources Management
Professor David Mulligan, The University of Queensland
Professor Chris Moran, The University of Queensland
Professor Jurg Keller, The University of Queensland
Clare Cote, Anglo American
Erika Korosi, BHP Billiton
Scott Diggins, Rio Tinto
Chris McCombe, Minerals Council of Australia
Darren Moor, QLD Dept of Natural Resources and Mines

Chair: Mark White
Professor Alice Clark, The University of Queensland
Professor Chris Moran, The University of Queensland
Dr Geoff Gault, JK Tech P/L
Barun Gorain, Barrick Gold
Steve Liddell, BHP Billiton
Andrew Logan, Newcrest Mining
Rob Dunne
Chris Goodes, Rio Tinto
Walter Valery, Metso Process Technology & Innovation
Natascha Viljoen, Anglo American

Chair: Greg Chalmers, Jellinbah Resources
Professor David Brereton, The University of Queensland
Professor Chris Moran, The University of Queensland
Mike Oswell, Anglo American Australia
Greg Dalliston, CFMEU Mining and Energy Division
Peter Newman, Downer EDI Mining
Gavin Lind, Minerals Council of Australia
Paul Harrison, QLD Dept of Mines & Energy
Jason Economidis
FINANCIAL STATEMENT

Income and Expenditure Statement
January 2015 to December 2015

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<td>Other</td>
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<td><strong>Total Revenue</strong></td>
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<th>Expenditure</th>
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<tr>
<td>Salaries</td>
<td>21,771,362</td>
</tr>
<tr>
<td>Non Salary</td>
<td>10,001,327</td>
</tr>
<tr>
<td>University Corporate Overheads</td>
<td>4,964,138</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td><strong>36,736,827</strong></td>
</tr>
</tbody>
</table>

SMI Funding

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>44%</td>
</tr>
<tr>
<td>Government</td>
<td>25%</td>
</tr>
<tr>
<td>Research Funding Bodies</td>
<td>24%</td>
</tr>
<tr>
<td>(e.g. CRC ORE, CSIRO, AMIRA) and Industry Funding Bodies (e.g. ACARP, MCA, QRC)</td>
<td></td>
</tr>
<tr>
<td>Non-Government Organisations</td>
<td>7%</td>
</tr>
</tbody>
</table>

SMI Top 10 Company Contributors 2015

<table>
<thead>
<tr>
<th></th>
<th>% of Total Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG Group</td>
<td>19%</td>
</tr>
<tr>
<td>Anglo American</td>
<td>4%</td>
</tr>
<tr>
<td>Arrow Energy</td>
<td>4%</td>
</tr>
<tr>
<td>Australian Pacific LNG</td>
<td>4%</td>
</tr>
<tr>
<td>Santos</td>
<td>3%</td>
</tr>
<tr>
<td>Sandvik Mining</td>
<td>2%</td>
</tr>
<tr>
<td>Newcrest Mining Limited</td>
<td>2%</td>
</tr>
<tr>
<td>Glencore</td>
<td>1%</td>
</tr>
<tr>
<td>Sibelco</td>
<td>1%</td>
</tr>
<tr>
<td>Rio Tinto</td>
<td>1%</td>
</tr>
</tbody>
</table>

The table above indicates gross revenue flows across all activities within the Institute. A significant portion of the $12.8m University revenue is returned to the University to cover various University Corporate Overheads.

University of Queensland Research and Innovation (UQRI) defines research as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes.

Activities that do not meet the UQRI definition of research are considered consulting. Other revenue sources refer to those not covered by the above categories and include trading revenue and membership fees.