

# wasm alumni review

wa school of mines alumni magazine



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durkin's world of inventions  
wasm graduate bringing the world clean energy  
the gold trail  
the latest in mining research



WINTER EDITION 2017  
Volume 2



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## Welcome to our second edition of the WASM Alumni Review.



Our industry has come through another mining cycle, the biggest boom that lasted over a decade and made Western Australia billions of dollars in revenue. But as the law of gravity dictates what goes up must come down. The industry always goes through the obligatory downturn. Downturns can be fast, usually lasting two or three years if we are lucky. During the downturn Universities see their enrolments fall for mining related courses, particularly geologists and metallurgists.

The irony is as we exit the downturn the skilled graduates have moved on to other careers. Anyone enrolling now in WASM will be in top demand at the end of his or her undergraduate degree as the industry cycle goes around again.

It is really important for the alumni to talk up the incredible lifestyle and career opportunities afforded to the graduates of the WA School of Mines and assist the school in reversing the low numbers of enrolment. The skills, practical and theoretical, we learn at WASM are easily transferrable. So regardless of where the cycle is when the graduates come out of the school of mines, it should have little impact on their job prospects.

Our profiles featured in this edition looks at the ever expanding

role of the WASM Graduate. Steve Durkin is a mine engineer whose inventions are transforming safety technology in the resources industry. Michael Ottaviano studied metallurgy and his company Carnegie Clean Energy is a leader in renewable power.

Ken Brinsden, CEO of Pilbara Minerals and Chairman of the WASM Alumni Finance Subcommittee, has pulled off a major coup by securing 20 million dollars from the Federal Government's Clean Energy Finance Corporation to become a significant investor in Pilbara Minerals.

As a member of the WASM Alumnis, one of our roles should be to promote collaboration between the resources sector and WASM. Good communication is so important if our school is to continue to deliver generations of young graduates that are flexible and in step with disruptive technologies. The alumnus acknowledges the importance of research and the role it plays for WASM's profile and rankings inside Curtin University. It is now the turn of industry to acknowledge the importance of this research and work with the WA School of Mines Curtin University through funding and co-operation.

Inside the review we have added sections on the latest research coming out of WASM. If you need to engage give us a call, we can put you in touch with the right people to help you out.

Our Scholarship fund supports the WASM students attending Kalgoorlie and Bentley. We would love all our members to be a part of the fund by making a small donation online. All donations are tax deductible. \$50 with your name on it will contribute to one of our major scholarship awards. Our scholarships are never just about money, they are about taking a student through their time of study,

mentoring them and offering them work experience so they are fully equipped to take on any challenges the workforce offers them. All our scholarship recipients who have graduated are fully employed within the resources sector.

All our donors will be recognised online.

Your alumni council is as busy as ever delivering you a range of exclusive services and events handled by our council members.

The AGM held on August 31st at KPMG, elected a new President, Vice President, Kalgoorlie Branch chair, two new council members and re-elected one council member.

The WASM Alumni council welcomes Mr Raleigh Finlayson, MD of Saracen Minerals as President, Mr Christian Price as Vice President, Mr Vic Simpson as Kalgoorlie Branch Chair, Mr Stuart Tonkin and Ms Keren Paterson for council and Mr Phil Plaisted was reelected.

Council thanks Mr Stuart Pether and Bronwyn Meadows Smith for their time on council. Ms Sabina Shugg has stepped down and joined the patrons group and I am delighted to announce I will have stepped into the role as Chair for the patrons Group. We thank Mr Norman Moore for his time and wish him the very best. Don't forget to add the events to your calendar: [wasma.com.au/events/2017-11/](http://wasma.com.au/events/2017-11/)

I look forward to catching up with you

*Bill Beament Chairman WASM Alumni Patrons Group  
Executive Chairman Northern Star Resources  
Former President WASM Alumni  
2012 - 2017*

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Sandvik and WASMA - partnering for a better future and education in the resources sector.

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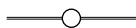
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## INNOVATIVE MINING SOLUTIONS



# STEVE DURKIN

*The founder and CEO of Safescape Steve Durkin says studying at the WA School of Mines gave him a license to learn.*



**T**he founder and CEO of Safescape Steve Durkin says studying at the WA School of Mines gave him a license to learn.

Graduating in 2002 with a degree in mining engineering, it was while working underground as an airleg miner that he stumbled upon the idea for a fully enclosed plastic escapeway ladder, the Laddertube.

“I scoured the internet trying to find if anyone had done anything similar and then patented it.”

In 2009 Durkin took the big leap of quitting his job and starting Safescape, with an eye to developing a Laddertube prototype.

“While I had [the] idea it took me

years to have the confidence, the belief,” Durkin said.

“I think that what is true of the majority of entrepreneurs there is a blind belief in your idea or ability to overcome obstacles, confidence but not arrogance, a strong belief to kick it off. As you go along, and say you can’t quite find a solution, you just tell yourself you can do this, just keep going.

“Then there is that internal anxiety, if you don’t do it it won’t happen. The need to not regret and the fear of missing out is stronger than that fear of failure.”

Durkin advised recent WASM graduates to keep learning as much as possible if they dream of branching out on their own.

“WASM, in my experience doing a degree, it gave me a license to go and learn and be interested in working in the industry.

“The beauty of the WASAM degree was being immersed in mining in Kalgoorlie and having jobs in



the industry while at school,” Durkin said.

“I don’t think as it’s structured at the moment it teaches students much more about emergent technologies and the opportunities there. You graduate realizing that you actually don’t know that much, other people know more – but it gives you the desire to know more and to go from no idea to having a personal idea, walking out of there saying ok I don’t know very much but I want to know more.”

“I don’t think when you first graduate you have the knowledge of the commercial realities to be able to [start your own business],” Durkin said.

“You just have to go and learn, be

interested in the way things work, technically or culturally [and] the need to really care and be interested in it.”

“The more knowledge you have the more you can mould it into an idea. At that point, you’ve got an idea, now you need a commercial strategy to bring it into the market and have a go, try, you’ll still be here tomorrow, just try.”

Since 2010 over 19,000m of Safescape Laddertube has been manufactured in the Perth suburb of Forrestfield and installed in mines across the globe.

Durkin was recognized at the 2015 40Under40 Awards, winning the small business/start up category.

He credits Safescape’s continued success to its size.

“It’s partially [because we’re] a private company, small, whereas in a large company it takes time to get authorization and they can never take a risk without consulting investors. Whereas we can afford to make a mistake so we’re able to just make a decision.”

Durkin says the best part of his job is seeing an idea come to fruition.

“It’s everything. I have a great time sharing our successes, watching people grow and seeing the questions being answered. The raw enjoyment of the innovation process; the spark of finding an idea and then developing it.”

Safescape were awarded the Customer Pitch prize at the 12 week KPMG Enterprise 2.0 program in March this year. The program, designed to help startup companies develop and commercialise their products, has backing from

Woodside Petroleum, Wesfarmers, South32, BHP Billiton and Chevron.

“[Safescape] were probably the [start up] furthest down the track; although we’ve been going for less than 10 years and we met the startup guidelines, the other companies were true startups. Most of them didn’t have revenue from existing products or products tested but not commercially tried.

“But from a product point of view we were in the same place.”

Safescape’s latest product is the Edge Protector, a modular plastic wall system designed to support the dirt embankments that line the edge of haul roads in open pit mines.

“It is essentially a modular cantilever wall that creates a vertical front face to a rock bund for roadway delineation. It reduces the likelihood of a truck going over an edge and in doing so reduces the footprint required for haulroads. The safety benefits are clear but the economic benefits on most sites will be very significant because the system effectively reduces stripping ratio.”

Durkin said product site testing, with Evolution Mining, had gone better than he and his team imagined.

“Normally you take a few tries but we thought let’s try it as is and it just so happened it worked first time.”

The importance of safety at mine sites around the globe promises a large market for the product.

“Safety is important everywhere,” said Durkin, “snow and ice, rain, these things add risk. In Australia we have generally good conditions, we do a lot of stuff that reduces the likelihood happening, however here we also have accidents. In WA a truck driver on night shift fell asleep and woke up with his truck resting over the edge; we had a fatality last year in WA, it does happen.”

However he believes there remains a gap in the industry between safety administration and practice.

“There is a discord, in my experience 15 odd years ago anyway, of people’s attitudes versus attitudes of administrative control. It was very much the idea is conceived, create those processes and then shove people into a working mine and ask them to get the job done as fast as they can in a hot, dirty mine.

“It’s human nature to take the easiest option so although [safety] is written it’s not real because no-one will care as long as they get the job done when exposed to that environment and culture.”



*Safescape were awarded the Customer Pitch prize at the 12 week KPMG Enterprise 2.0 program in March this year.*

Safescape currently manufactures its Laddertube and three other products from its warehouse in the Perth suburb of Forrestfield. However shipping the Edge Protector is not the most cost effective way of delivering the product and Durkin’s next idea is to build automated mobile manufacturing hubs, housed on or near a group of minesites.

“We’ve had [interest] in mobile sites from a couple of mine sites in America, but it’s a slow progress to funding to do the project. In terms of project management, it’s question of the corporate structure as no-one has a budget for this, they can’t find the capital for it.”

“What I would like to see happen is mining companies using special needs companies, partnering, like with exploration companies, with smaller companies who can work quickly, generate information in terms of data. If they came to us with the problem we would fix it a damn site faster than they could.”



# WAVE OF AMBITION

*WASM graduate Dr Michael Ottaviano never planned to be a global leader in renewable energy technology. Charting his journey from a degree in metallurgy to CEO of Carnegie Clean Energy, he discusses the opportunities renewable energy holds for the mining industry and shares how optimism, timing and luck over planning can shape a successful career.*

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**A**t seventeen Mike Ottaviano wanted to be a geologist.

“I really loved rocks I guess,” he said.

An industry scholarship to the WA School of Mines changed his mind and Ottaviano graduated with a degree in Metallurgy in 1994.

“What sealed it for me was that I got a scholarship you know, someone paying me to go to University and to leave home at 18,” he said.

“If I was going to work in a mining industry why not live in a mining town?”

Ottaviano says he never planned a career path and doubts those who claim to have mapped theirs from A to B.

“Is anyone really like that? I think they make it up retrospectively, look back and connect the dots, but purely for me I only ever look a couple of years ahead at best and if an opportunity arises that I’m passionate about, even if it involves a bit of risk, if I think I can get my head around the downside then I’ll jump at it.”

“Between my third and fourth years [at WASM] I did my vac work in Perth at an engineering firm called Hoffman engineering who did mining servicing work – they maintained equipment on mine sites – but they

also had a metallurgical department, secondary metallurgy doing heat treatment.

“They offered me a job there and then and I accepted it and then I reneged on it thinking ‘no, I better go back and finish my degree,’ so I went back and did my last year at uni and they were kind enough to offer me a job again when I finished.”

At Hoffman, Ottaviano was introduced to what would become his passion: research and development.

“A lot of their research and development was metallurgically lead, materials and metals based R and D. So that got me into R and D generally.”

Ottaviano says his experience at WASM was “fantastic.”

“As an institution, to be in a mining town, with vacation work on mine sites- I worked underground at Golden Crown gold mine, on the mill

and in processing labs so I don't think it could prepare anybody better for working in mining."

He believes Kalgoorlie remains a vital center for mining education, despite the exodus of industry and population during the downturn.

"Mining companies will always have an interest in employing the best graduates and I think that's what WASM focuses on producing, the best for the mining industry, and I think having a local presence is what's a part of that."

"If [WASM] was diluted to become a purely Perth based campus I think it would lose a lot of its value."

"I had a fantastic time in Kalgoorlie, I played a lot of footy and cricket, I lived in the pub, worked behind the bar, I had a great time."

"It's not always an easy experience living in Kalgoorlie, for a 17/18 year old, but it essentially prepares you for that life because you're going to end up working in places a whole lot smaller, and hotter, and less pleasant, so you're better off going in with your eyes open I think."

After working for Hoffman Ottaviano moved to Germany, where he first came in contact with renewable energy.

"I was fortunate enough to be in Germany just at the time for what's called the energy bender, the energy change there – they really led the world in solar energy. So I watched that sort of evolve and thought wow, now if Germany can do this with their poor solar resources then why can't Australia?"

"So it was kind of in the back of my mind that this was inevitable and I'd love to be a part of it at some point but I didn't really have a plan."

Having completed a Masters degree in product development, Ottaviano returned to Australia where he

achieved a PhD in research and development and worked as an R & D consultant.

"I got to the point where I wanted to get back into doing R and D properly in the sense of commercializing the technology myself," Ottaviano said.

"It just happened to be that the technology, when the opportunity presented itself, was a renewable technology."

"The opportunity arose with Carnegie where there was intellectual property around wave energy, there was a shell and there was an opportunity for me to be involved in R&D again so I jumped at it," Ottaviano said.

Perth based company Carnegie has intellectual property rights over the CETO system, a wave energy collection device. But as the technology has yet to be commercialised, the ASX listed company has relied upon Federal and State government support and investors to generate income.

Ottaviano says he always saw Carnegie as a diversified renewable energy company.

"It might have taken a bit longer than planned; we started working on diversifying the business in 2014," he said.

"The opportunity arose when we were talking to island nations, who were approaching us wanting to purchase a wave energy product which we weren't ready to sell them."

"But when we spoke to them what became apparent was what they needed wasn't a wave energy product but an energy solution – an integrated, technical solution, some combination of different generation sources - and they needed potentially energy storage - but they also needed a financial solution as well."

"We saw then we had the capability that could allow us to bring together an integrated energy product to a very underserved market of island and indeed off grid sites. What we couldn't do was the solar battery piece so we looked for a partner."

In 2015 Carnegie started working with Energy Made Clean, acquiring 100 per cent of the company last December.

"I guess for a lot of people it was like 'wow, Carnegie's suddenly moved into solar batteries,' but we've been working on and talking about microgrids for a few years," Ottaviano said.

The company's acquisition of microgrid developer Energy Made Clean has placed it in a prime



position to supply cheaper, cleaner energy to isolated and off-grid mining operations.

"It could be a mining company running off grid and looking for energy to power its processing plant or mining operations; under that scenario they could do two things: buy the design and plant from us and then do it themselves and finance it themselves and just pay us a lump sum for the delivery of that, or we could design an offtake supply program with them where we basically disrupt the finance and sign a contract to supply them with a 10 to 15 year lump sum," Ottaviano said.

"Mining has a huge positive impact on a community or environment, obviously if done the right way, no one is more aware more than me that solar panels, batteries, waves all rely on those commodities."

"[Mining] can power itself with renewable energy but also there is the mining opportunities renewable energy throws out. Lithium is the obvious one but there are any number of often quite rare elements in solar panels and batteries- and something simple like copper, the more electrically powered we are the vast amount of copper we'll need."

"The beautiful thing about hybrid systems or micro systems is that when you go off grid currently, and you're a mining company, solar battery diesel microgrids are cleaner, cleaner and more efficient than diesel itself."

He says more mining and resource companies would be enjoying the cost-benefits of microgrid technology if their executives better understood the technology.

"It's usually just a matter of education," he explained.

"Energy is inherently complex at the best of times without layering it without policy and uncertainty; not even just your average dad, even CEO's of mining companies have difficulty understanding it.

Ottaviano said being CEO of Carnegie required him becoming part salesman, part translator.

"Absolutely [you're a salesman], that's an important part of being CEO...you've got to be technically literate enough to understand what the engineers are telling you or talk to an investor and that's the same if you're a mining CEO or a renewable

CEO or an R&D CEO."

"That ability to communicate is integral," he said.

"Wave technology is highly complicated you know, it's almost the impossible renewable challenge, everybody's known about the power in our oceans - waves - for a very long time but nobody has successfully commercialized the technology, so that tells you how hard it is."

Moving into the solar battery market ensures Carnegie a revenue stream while waiting for commercialization.

"Wave continues as our kind of risk - reward play and we've got this proven technology business on the side as well now," he said.

He criticized the lack of long term vision by governments which he said had taken a toll on Australian uptake of renewables.

"That's not a criticism of the current government but a criticism of governments over the last decade. That lack has ramifications across many aspects of the economy

in renewable energy in the last decade, really in Australia, and whenever I go up to the UK and Europe these guys they love this and they know it is a great place to invest."

Yet attitudes are changing and Ottaviano says it was easier to raise capital as Australia slowly wakes up to renewable energy.

"The great thing about WA is that we do produce good engineers. So that's great for us. We've been able to leverage, mechanical, electrical engineers, draftsmen and the like who have done time in the oil and gas or mining industries then have come into something like Carnegie to do something different and maybe make an impact."

"It's not going to happen overnight but...we've gone in the last couple of years from saying there's no way in the world we're going to hit our 20% renewable energy target by 2020 to now, just in the last few months, people saying we're going to hit it and probably exceed it, and I think if we progress business as usual renewable energy will probably hit 30 to 40 per cent penetration by 2030; that's without trying to do anything."

"I think we'll quickly end up at 50% across the country, certainly by 2050 there's no reason why we couldn't be north of 80% renewable power as a country by then."

Ottaviano said he felt extremely fortunate to be in the middle of the energy disruption.

"This clean energy revolution really, that by a little bit of luck and a little bit of good management we just happen to be in the middle of at the moment and taking



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including the fact that it's very hard for big companies to make any investments in power generation at the moment because they don't know what the policy will be next year, let alone in ten years, and ironically enough all that uncertainty has meant an increase in pricing, and your average consumer ends up paying."

Carnegie's main offices are in the Perth suburb of Belmont, which Ottaviano said sometimes made doing business in renewables difficult.

"I often think it would be much easier if Carnegie's headquarters were in Sydney or in London... particularly in the energy space and renewable energy, it's been pretty tough to get anyone in WA interested

advantage of it."

The Carnegie CEO joked that his positive attitude was "probably indicative of a lack of intelligence."

"I am I suppose a pretty optimistic person, and if Carnegie has any success - and one of the reasons it's been able to succeed where others have failed- is we've always got options. You know we formulate a strategy, we work towards meeting that strategy but we know that there's uncertainty in what we do, technology uncertainty and funding uncertainty but also regulatory uncertainty and market uncertainty that if you locked your job into a single pathway, something is likely to come unstuck."

"If you've got a range of options and we have a range of options around our technology, in the worst case you've got at least one which is still viable.

"It's a great thing to be able to work on something which is both exciting and can have a positive impact on the environment.

I think I would struggle to go back and work in or for an organization that wasn't having a positive impact on its community or environment."

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## Q&amp;A

*1993 WASM graduate Sabina Shugg has been awarded a lifetime membership with WASMA in recognition for almost singlehandedly been a beacon and pathfinder for women in mining which is extremely important to the function and success of the Alumni. In addition to her contributions to WASMA she has been widely recognised by her peers and other institutions.*

**Q.** Do you think universities are preparing today's graduates for the needs of the mining and resource industry? What areas do you think WASM students should focus on to have a sustainable career and are there any skills current and future graduates might need which WASM currently doesn't provide?

**A.** In our rapidly changing world we need to be very nimble and creative in our thinking to be able to rise to challenges and realise opportunities. There's plenty of research that has shown that diversity in teams leads to more creative and innovative thinking and better return on equity for those teams. In a similar way I think we as individuals need to be

diverse in our outlook so to me that means we need to get involved in lots of different activities and aspect of our communities so that we can be interesting and open to different ways of seeing and doing things and ready to realise those opportunities.

Keeping mentally healthy is an important skill - it can be very tough out there at times - and I really like the "Act, Belong Commit" model.

Act - Be physically, socially and mentally active

Belong - Keep up friendships, join in clubs and community events

Commit - Support a good cause and help others

From my own experience I can tell you that following this model can contribute to good mental

health as well as helping you develop your own profile and community. It's important to understand how important commitment is as short term involvements don't give the same rewards.

**Q.** What is the best part of your job and what aspect do you enjoy the most?

**A.** Over the years I've enjoyed different aspects of each job. Early in my career there was plenty of adventure and excitement working remotely in great teams with big challenges to overcome. Today I enjoy working with a whole range of people in many different environments. Working with people is an important part of my work and

something I enjoy. I like being able to support and encourage others to realise the many opportunities that can be had for both men and women in the mining industry. I always enjoy catching up with people and hearing about their new roles and their successes.

I never would have thought I would end up working for a company like KPMG but here I am and it's a great place to work. KPMG is much more than the 'bunch of accountants' that it was in years gone by. Today as well as the mining professionals there's a diverse range of skills from medical doctors, neuroscientists, environmental engineers and even Olympic swimmers in our team. It's a dynamic and energetic team environment.

*Q. You've worked for small, medium and large companies in the sector. What benefits or downsides did you find?*

**A.** I really enjoyed being part of small teams where you got involved in everything – you learn to communicate well so that everyone is on the same page. Then when you work in larger organisations you have to learn new ways of communicating so that you don't end up in a silo. I think it's good to be exposed to a variety of ways of working. There are benefits and downsides to each organisation but what is an benefit at one place for me may be a downside for you so it is very individual.

*Q. What are the advantages and disadvantages of living and working in WA?*

**A.** Why would you live anywhere else? But seriously, there's a lot going on here in WA in our sector and so I think it is a great place to be and to live and work. We've had a long history of mining innovation coming out of Perth and WA and I think particularly now with increased government and support for initiatives such as KPMG's Energise accelerator programme where we worked with both resource sector start ups and companies such as South 32 and Woodside and helped

the two groups come together and talk each other's language so that they could realise opportunities.

The Energise 2.0 programme had the startups participating in 12 weeks of workshops, mentoring and engagement with industry leaders, entrepreneurs and subject matter experts from around Australia and beyond. In parallel, the mining and METS companies participate in a series of innovation master classes and collaborative workshops, to help them become better at engaging with external sources of innovation.

One of the start ups was Safescape, which was founded by WASM graduates Steve Durkin and Amanda Giles. Many of us know Safescape through their underground ladderway systems but they have a new innovation - a product called Edge Protector that improves safety and in some cases allows for the design of narrower haul roads (<http://safescape.com/edge-protector-ep/>).

*Q. You have received many accolades for your achievements both professional and for supporting other women in mining. How have these acknowledgements helped you professionally and in your philanthropic work (if at all) and is the industry doing enough to highlight its best and brightest?*

**A.** If you can't see it then you can't be it. I'm not sure who said that. We need to be promoting role models and celebrating successes– getting people within the industry and outside the industry to see that there are opportunities for both men and women in the industry – and that women are now doing every sort of job in the mining industry. The mining industry has always relied on innovation and creative thinking and realistically we need inclusive and diverse workplaces and gender balance to get that dynamic.

We need to work together to support and advocate for women in mining. More women staying longer in the industry means there they are more likely to be more women in senior roles.

We hear a lot about productivity being a key issue and thus innovation and creative thinking and the right dynamic is essential. We all need to

work together to achieve this. We all have a part to play.

I'm just playing my part.

As anthropologist Margaret Mead said “A small group of people can change the world, indeed it is the only thing that ever has”

*Q. Did you have a mentor/someone you admired professionally?*

**A.** I've had a few mentors over the years but I wish I'd had more. It's interesting really as I think the benefits of being a mentor are often poorly misunderstood. Sometimes you can learn a lot about yourself by being a mentor to someone else. It's very much a two way street.

*Q. Did the Kalgoorlie location benefit or detract from your WASM experience?*

**A.** I studied at WASM as a mature age student. I was already living and working in Kalgoorlie. I really enjoyed my time in Kalgoorlie and loved being able to work and study there at the same time. I had a part time job at the mine that I'd been working at before I took up full time study. It was good to be able to put into practice some of the things I was learning while I was learning them. During this time I was also able to work in the Northern Territory and spent a summer break working in Arizona in the United States. I also enjoyed a field trip to South Africa with the School of Mines.



*In our rapidly changing world we need to be very nimble and creative in our thinking to be able to rise to challenges and realise opportunities.*

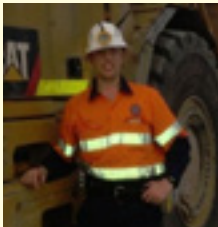
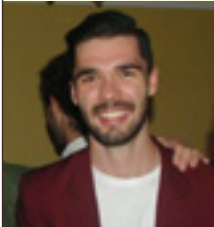


Sarah Arnoldi

The Gold Industry Group is thrilled to partner with the WA School of Mines Alumni to support diversity within the school and the wider industry. We are delighted to provide a diversity scholarship to WA School of Mines geology honours student *Sarah Arnoldi*, who is currently investigating the Neoproterozoic links between Australia and Antarctica. We wish Sarah all the best and look forward to following her journey.

- Left to right
- Chris Rutherford, Neometals
  - Janelle McPhee, Saracen
  - François Theron Davey, Bickford
  - Dane Padley, WASMA
  - James Waterhouse, T Partners
  - Natalee Evans, WASM Fund
  - Trent Nayler, Byrnecut
  - Jonathon Flynn, Byrnecut
  - Sarah Arnoldi, GUG

- No image available
- Diana Hoyos, Goldfields
  - Munkhjin Sandaadorj, RUC



The WA School of Mines Alumni Scholarship Fund is Tax Deductible.

Build your Company Brand in your community by supporting the students from the WA School of Mines.





#### **WASMGA Scholarship and Bursary Fund INC**

Since 2012 the WA School of Mines Alumni has raised over 300,000.00 to fund scholarships for all WASM students.

The fund is dedicated to the welfare of students attending both Kalgoorlie and Bentley campuses of Curtin University. Part of the scholarship is to offer mentoring and assist in securing Vacation work during study break.

Whether it be to ease financial hardship, reward academic excellence and leadership or to enable regional students the educational experience opportunity that the WA School of Mines offers, WASM Students benefit from the alumni's fund in so many ways and assists them on the path to success in the Resources Sector.

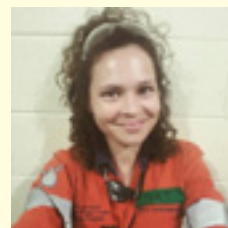
We are asking for your help to increase the number of scholarships per year.

You can donate by simply going to <https://wasma.com.au/fund/>

The fund is tax deductible and a registered charity and any amount you can spare would be greatly appreciated.

The WASMGA Scholarship & Bursary Fund Inc. allows you or your company to get involved and give support to the next generation of world-class mining graduates.

Bill Beament  
President WA School of Mines Alumni and Scholarship Fund  
Chairman Northern Star Resources Ltd



#### **THE WA SCHOOL OF MINES FUNDING COMMITTEE**

was set up by Curtin University Foundation Board at their meeting held on the 1st of March 2017. The committee is chaired by Mr Neil Warburton, with Stuart Pether and Tony James representing the alumni.

The Western Australian School of Mines Funding Committee (WASM Funding Committee) has been established to assist and oversee the process of application and allocation of funds to WASM and WASM/WASMA scholarships.

Natalie Evans, WASMGA Scholarship Recipient was awarded \$5000.00 from the fund. Natalie graduated mid year and has a Bachelor of Science (Applied Geology)/Enviro Biology. Natalie is currently working for Northern Star Resources

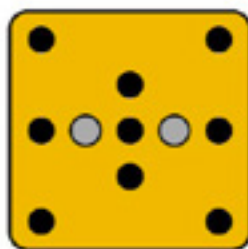
**The WA School of Mines Alumni warmly thanks our scholarship donors**



**Resolute**



**NORTHERN STAR  
RESOURCES LIMITED**



**BYRNECUT**



**Saracen**



**GOLD FIELDS**



**Neometals**



**WASM ALUMNI SCHOLARSHIP FUND  
BECOME A DONOR AND BE A PART OF THE NEXT GENERATION OF  
MINING GRADUATES FROM THE WA SCHOOL OF MINES**



**FREECALL: 1800 688 377**

For all general or research enquiries,  
please email: [WASMAAdmin@curtin.edu.au](mailto:WASMAAdmin@curtin.edu.au)

WA School of Mines Curtin University” is investing in the future of mining in WA with graduates ready for the industry and research to make us more productive in a competitive global environment.

~ Bill Beament Chair WASM Alumni Patrons Group

## THE MINING INDUSTRY’S SKILLS NEEDS IN RESPONSE TO THE GREEN ENERGY ECONOMY

### Professor S. T. Hall,

Executive Director  
Mining Education Australia,  
Western Australian School of Mines,  
Curtin University, Kalgoorlie, WA  
6433, AUSTRALIA  
[s.hall@curtin.edu.au](mailto:s.hall@curtin.edu.au)

There is a naivety within the general public that the move to a green energy economy signals the end of the mining industry, in particular, the coal industry. The lack of knowledge that the green energy economy is going to rely on an expanded skill set for the mining engineer has significant implications and provision of quality graduates stands out as the most visible. These graduates will need a broad knowledge of the mining value chain covering exploration, mining and processing in addition to well-developed awareness of the speedy innovations in materials science that are driving the green energy

economy. Graduates will also need an understanding of global political and business situations as well as strong community engagement skills to promote resource extraction.

The current renewable energy sector (hydro, solar and wind) is dependent upon products of the mining industry such as copper windings in turbines, high-purity silicon in photovoltaics and steel/concrete support structures. Steel production requires metallurgical coal together with the myriad of alloying elements including nickel, molybdenum and chromium. The move to battery storage technologies and electric-powered transport expands the range of mineral commodities that must be supplied. Among them are rare earth magnet materials, copper and nickel. The average battery-powered electric vehicle will contain 80 kilograms of copper, four times as much as an internal-combustion engine

(1). Coal-generated electricity might reduce as a percentage of total power generation; however, it is likely to provide important base load generation for many years. Further, there is an opportunity for important resource recovery from ash residues, e.g. magnesium, gallium, and germanium.

The speed of innovation driven by materials science, introduces a greater risk of commodity substitution than in the past. This further supports the requirement for rapid delivery of commodities to market in mine developments. Conversely, the necessary exploration, planning, construction and associated environmental approvals can take 10 years or longer and the whole process can be delayed, or even prevented, through community opposition to mining activity.

Mining industry is well accustomed with the business reality of commodity price cycles and supply-demand relationships. Nevertheless, management of these factors remains challenging for the industry and all stakeholders experience their impacts. Greater ownership of external environmental and social impacts will be necessary in future.

(Full Transcript for members can be viewed at <http://wasma.com.au/membership/papers-presentations/>)



**PROFESSOR STEVE HALL** is a leading Australian academic in mining education. He was the Director of Curtin University's Western Australian School of Mines from 2010 until early 2016. This involved responsibility for multiple campus delivery of programs in applied geology, spatial sciences, exploration geophysics, mining engineering and metallurgical engineering to over 3,000 students.

He commenced the role of Executive Director of Mining Education Australia (MEA) in January 2016. MEA is a collaborative venture in curriculum development and delivery involving three partner Universities (New South Wales, Queensland and Adelaide). Collectively the four member Universities account for over 80% of Australia's 4-year BEng Mining Engineering graduates.

of very different commodity types, but most importantly, obtain ore types from different parts of a deposit to ensure, that alteration minerals and textures are taken into consideration. Certain licenced metallurgical laboratory tests do not take into consideration the 'elastic' minerals present in the calculations. Elastic minerals present energy consumption problems in a grinding environment. Platy, soft minerals like micas, clays and perhaps chlorite would absorb a percentage of the impact energy from the mill charge, like balls and rods, or simply other ore particles in autogenous grinding. These minerals can also end up 'armouring' the inside of a mill and clogging the profile of the lifters on the mill liners, thus altering the efficiency of the grinding and tumbling action.

The aims of the research would be to investigate the effects of a super cooled-liquid would present using a selection of bankable metallurgical laboratory tests, on a suite of different ores. Fundamental studies must be carried out on the character of each ore type, investigations in the Young's Modulus (E) for individual minerals would be recommended. Methods for such measurements have been carried out in the past and documented (Angel, 2009). Specifically by Schlumberger technology group in the late 1980s, but it should be noted that this really related to whole rock analysis (Schon, 2011). This research requires the analyses on individual minerals, specifically those found in the alteration volumes or hydrothermal zones.

Angel, R. J. J., Jennifer M.; Reichmann, Hans J.; Speziale, Sergio. (2009). Elasticity measurements on minerals: a review. *European Journal of Mineralogy*, 21(3), 525-550. <http://dx.doi.org/10.1127/0935-1221/2009/0021-1925>

Ballantyne, G. R., & Powell, M. S. (2014). Benchmarking comminution energy consumption for the processing of copper and gold ores. *Minerals Engineering*, 65, 109-114. <http://dx.doi.org/http://dx.doi.org/10.1016/j.mineng.2014.05.017>

Napier-Munn, T. (2015). Is progress in energy-efficient comminution doomed? *Minerals Engineering*, 73, 1-6. <http://dx.doi.org/http://dx.doi.org/10.1016/j.mineng.2014.06.009>

Schon, J. H. (2011). *Physical Properties of Rocks : A Workbook* (Vol. 8). United Kingdom: Elsevier.



## Louisa O'Connor

*Associate Dean for Teaching and Learning - WA School of Mines (Mining and Metallurgy, Spatial Sciences, Applied Geology and Exploration Geophysics)*  
*Senior Lecturer and Researcher: Geometallurgy*

concentrator when processing ores. Crushing, but more importantly comminution uses the most amount of energy to reduce the size of the ore (Ballantyne & Powell, 2014; Napier-Munn, 2015). Different crushing, grinding and milling methods are continually being developed and implemented in operational environments, but are still requiring high power inputs to push through the tonnages required for production targets.

Ore comprises varying mineralogies, textures and physio-chemical properties throughout a deposit. Geometallurgy and grade engineering alongside sorting methods helps to compartmentalise ore types. Even though selection of ores based on targeted parameters can then be achieved, the materials most often pass through a secondary crushing stage, whether that be underground or in-pit, prior to grinding. All the materials apart from those with high gangue percentages or extremely low grades will pass through the concentrator. The sorting, crushing and blending stages tend to split out ore textures, densities and grade. It is the ore's mineralogy and the character of that mineralogy which will dictate the amount of energy required to reduce its size in a mill.

This study aims to select a group

## 2 x PhD - seeking industrial support.

The proposed research project is envisaged to have two students over 3 – 4 years.

*Student one proposal:* (Process Mineralogy / Mineral Processing) Using mineral physics techniques to find a way or ways to test individual mineral species and their physio/chemical behaviour under supercool conditions for elastic property and prediction of comminution performance.

*Student two proposal:* (Geometallurgical Engineering) Designing an ore characterisation programme for throughput based upon super cooling pre-treatment of ores utilising mineral abundance and texture. Studies on the implications to planning and resources modelling for throughput calculations and energy consumption are expected.

### PROJECT TITLE:

**Reducing energy consumption during comminution and increasing throughput using supercool liquid pre-treatment of ores.**

It is well known in a production environment in industry that the biggest consumer of energy (power) is the

# KALGOORLIE BRANCH AGM CHAIRMAN'S REPORT –

## WASMA Kalgoorlie Branch 30th August, 2017

*Good evening and welcome everyone to the 2017 AGM for the 2017 WASMA Kalgoorlie Branch.*

I would like to open this AGM by thanking all of the committee which without we would not be able to complete the endeavors we have set ourselves for the last 12 months. They have conducted themselves professionally and shown to be selfless with the donation of their time to all of the work that helps the events, support of student initiatives, mine tours and the WASMA council and its sub committees.

As I am stepping down as the chairman of the Kalgoorlie branch I would like to take this opportunity to thank everyone for their support over the last 4 years while being the branch chair and hope you all offer the same support you have given me to the new chairperson.

This year we conducted 5 committee meetings which also included a workshop designed to align ourselves with the WASMA council strategic direction. The challenge moving forward is to build up the regular meetings and continue to align with the WASMA overarching strategy work.

The committee has again continued to build on the charter we set ourselves in 2013 with the creation of the WASM Alumni Kalgoorlie Branch and I believe we have continued to uphold the objective originally set which was to reconnect with our local members and relevant industry and community stakeholders and continue to build these positive relationships.

Our key achievements are listed below for the last 12 months squarely aligned with our charter,

*• Increase and retain WASM Graduate membership base in the region by:*

» The holding of constant reliable events gives WASMA ability to retain local members and offer some value for their membership \$

» Addition of more diverse representation on our committee by the addition of graduates from metallurgy, geology and survey which covers all of the Core mining related disciplines represented by WASMA.

» The inclusion and joining of student members at select events which as they graduate will morph into a stable member base for the future

*• Strengthen Communication links between the WA School of Mines Students, Staff, Alumni and industry in the Kalgoorlie/Goldfields Region by:*

» Committee members on the Mining and Metallurgy Advisory Boards and the Kalgoorlie Campus Council which are actively participating in discussions and reporting back to the Kalgoorlie committee.

» Providing industry connection for the 4th year talks

*• Foster the mining culture & camaraderie amongst WASM Grads and other industry associates along with respect for local community needs:*

» Assistance with WASM students forming a mine rescue team to compete and be involved with the Chamber of minerals and energy mine rescue competition in which they competed in the Underground competition and placed very highly for a brand new team with limited experience.

*• Coordination of WASMA Events in the Kalgoorlie region. The following events were coordinated and successfully held with more planned for the remainder of 2017:*

» Sundowner.....October 2016  
 » Family Day .....February 2016  
 » WASM Graduation Dinner .....May 2017  
 » D&D Sundowner.....August 2017

Thank you for all attending this AGM and I look forward to nominations for the general committee and Senior Leadership.

Nick Chernoff  
 Chair - WASMA Kalgoorlie Branch

## THE WA SCHOOL OF MINES ALUMNI KALGOORLIE BRANCH EVENT GALLERY



THE WA SCHOOL OF MINES ALUMNI KALGOORLIE BRANCH is the Alumni's best way to stay connected if you live in the goldfields region or FIFO. You can connect with the branch by contacting [admin@wasma.com.au](mailto:admin@wasma.com.au) and we will put you in touch with the committee. The Kal Branch holds a number of lively

sundowners and family days throughout the year. If you are a paid up member these events are free.

Non-members can expect to pay no more than \$30 a year. If you would like to sponsor the Kalgoorlie Branch's events, give Tim Campbell a call on 0459 997 718.



Australia's first dedicated mining poscasts - the WASMA Podcast. We're bringing you discussions on leadership, management, strategy, finance, mental health, career planning, finance and retirement planning and stories from WASM Graduates. Let us know about the topics and people you want to hear about a [podcast@wasma.com.au](mailto:podcast@wasma.com.au)



# TRAIL TO TELL THE STORY OF A CITY BUILT ON *gold*



*WASMA is proud to partner with the Gold Industry Group to support and educate future generations. Representing a united voice for Australia's gold industry, the Gold Industry Group works to promote the importance of the sector, including raising awareness of the metal's past and present contribution through initiatives aimed at the general community. The virtual #heartofgold Discovery Trail is coming to Perth in 2017.*

**G**old has retained a hallowed place in the history of the Australian resources sector and beyond for generations, and its central part in Western Australia's past is both colourful and fascinating.

However, the story is far from over, and the importance of this rarest of precious metals in today's economy can be seen with more than 70% of the nation's overall gold production coming from WA. If WA was a country, it would be the 5th largest gold producer in the world.

The discovery of gold in WA carved the way for an industry that has significantly contributed to the growth and development of the state. WA's long history of gold mining dates back to the 1880s, with the first gold rush sparked by the discovery of the 'Golden Mile' at Kalgoorlie in the 1890s, believed to be the richest square mile of gold reserves in the world.

One Saturday morning in 1892 prospector Arthur Bayley carried a staggering 540 ounces (over 15kg!) of gold from Coolgardie straight to the bank in Southern Cross. Bayley and his partner William Ford's gold strike was one of the first noteworthy gold finds in the State, and a frenzy of gold miners were on their way to Coolgardie within hours of the news getting out.

That was just the beginning. Nine months later WA's biggest gold rush was set off with Paddy Hannan's

discovery of a new gold district 40 kilometres east of Coolgardie, known as the "Golden Mile". In 1894 alone, some 25,000 men from many parts of the world came to WA to try their luck as 'diggers'.

Perth is a city built on gold and the gold rush secured the economic future of Western Australia. No longer was Perth a struggling British colony - its population, economy, transportation network and foreign trade flourished - and one of the state's most successful industries was born.

The discovery of gold changed the physical nature of Perth city dramatically with economic prosperity and the increase of population as a result of gold rush immigration. In one decade the population of the city tripled, from 8,447 in 1891 to 27,553 in 1901.

The state produced more than two million ounces of gold in the year of 1903 alone - around 56,699kg! Gold's value skyrocketed and 88 percent of WA's export income between 1886 and 1900 was attributed to gold.

The gold industry in WA survived the challenges of the First World War, which saw mining activity and investment decline. However, the Great Depression in the 1930s brought revitalisation to the gold industry with a rise in the gold price and an increase in foreign investment.

It was the discovery of the largest gold nugget, the 'Golden Eagle', in a hole in the road in Coolgardie in 1931 that created a national sensation and saw many prospectors return to WA.

By the beginning of the twentieth century, Perth streets were lined with elaborately styled multi-storey buildings, built by gold mining entrepreneurs and government and to service the gold industry. Some still stand today, including The Perth Mint, London Court, McNess Royal Arcade and the Old Treasury Building, and will feature in the Gold Industry Group's virtual #heartofgold Discovery Trail.

Understanding the nation's humble beginnings and

learning of the impact the early gold rushes had on the development of Western Australia and the nation provides an appreciation of the vibrant Australian society of today.

The virtual #heartofgold Discovery Trail is coming to Perth in 2017 and will entertain, educate, engage and excite the wider community as they discover the rich history and importance of the gold industry to Perth city.

As the Gold Industry Group continues to bring the industry and community together, it will assist in ensuring a strong and sustainable future for the gold mining industry and help to communicate Australia's contribution to the wider community.

To find out more visit the Gold Industry Group's website and register for their community newsletter to receive updates on their ##heartofgold Discovery Trail.

GOLD INDUSTRY GROUP MEMBERS INCLUDE: *The Perth Mint, Gold Fields Australia, Doray Minerals, Norton Gold Fields, Ramelius Resources, Gold Road Resources, Northern Star Resources, Impact Minerals, S2 Resources, Capricorn Metals, ABC Refinery, Kalgoorlie-Boulder Chamber of Commerce and Industry, WA School of Mines Alumni, Macmahon Contracting, Ausdrill Limited, Brink's Australia, G4S International Logistics, SMS Innovative Mining Solutions, IFAP, WA Mining Club, Symposium, Bulk Bullion, Cannings Purple, Australian Gold Reagents, RECEO, BGC Contracting, Deloitte Access Economics, City of Kalgoorlie-Boulder, IRP Resources, Mining News, Mine Tech Australia, WA Rockdrill Club and Heritage Perth.*



## Reawakening the mining industry

WA mining icon Ron Manners has opened the vault and is building a website full of history, speeches, ebooks and other information on mining and economics in Western Australia.

This go-to resource is essential reading for students or anyone else interested in the mining industry and its impact on Australian economics.

Follow Ron on social media to keep up-to-date with content added each week.



[www.mannwest.com](http://www.mannwest.com)



[ron-manners](#)



[@RonManners](#)



[ron.manners](#)

# TAG Financial Group are now proud partners with WASMA.

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Fiona Morgan

## WASM ALUMNI MIC TALKS (Mining Innovation Collaboration)

**Mr Nev Power**

CEO Fortescue Metals Group

July 17 2017 @ KPMG - Event was booked out.  
FMG's Innovative Culture Delivers Results.  
Sponsored by Mintrex

Fiona Morgan, Executive Director Mintrex,  
Introduced Mr Nev Power



Nev Power

## WASM ALUMNI & CARNEGIE CLEAN ENERGY EVENT

**"Mining and the Energy  
Revolution May 31st 2017**

70 attended.

RIGHT: Michael Ottaviano, CEO Carnegie  
Clean Energy Standing next to Michael in order  
right - left:

- 1 The Hon Alannah McTiernan MLC, Minister for  
Regional Development
- 2 Peter Mann Advisian
- 3 Mark Thompson MD Talga Resources
- 4 David Flanagan Chairman Battery Minerals
- 5 Paul Vollant GM TNG Ltd
- 6 John Davidson MD Energy Made Clean



## WASM ALUMNI GRADUATION DINNER | May 5 2017

230 attended, fully booked out.

The dinner honoured the 2016  
WASM Graduates.

Sponsored by PYBAR, Principal Sponsor of WASMA and  
RUC Event Sponsor.

Andrew Borthwick Clarke received the WA School of  
Mines Alumni Gold Medal.

Ms Jacinta Parsons, BHP, was the key speaker and Ms  
Jayne Finch, KCGM, the MC.



Andrew  
Borthwick  
Clarke,  
WASM Alumni  
Gold Medal  
recipient.



(left) Barry  
Upton MD of  
RUC;

(right) Mr David  
Noort BDM  
PYBAR.



(left) Ms Janelle McPhee, WASMGA  
Scholarship Recipient presented  
membership to WASMA by Bill  
Beament Executive Chairman of  
Northern Star Resources



## WASM ALUMNI & WIMWA DIGGERS & DEALERS SUNDOWNER August 8

460 attended, fully booked out.

Curtin University honoured Mr Roy Woodall with the official dedication of the fourth building at the WA School of Mines' \$32 million Agricola student accommodation at the WASM alumni and Women in Mining WA sundowner at the WASM Graduates Hall.

Mr Woodall, who lived in Kalgoorlie for 20 years after leaving the University of California, Berkeley, in 1957 and ran the Western Mining Corporation exploration crew from the mid-60s until his retirement as director of exploration in 1995, said he was honoured to have the building named Woodall Hall as a recognition of his achievements.



Mr Roy Woodall and  
Professor Andris  
Stelbovics  
Pro Vice-Chancellor



## SAVE THE DATES 2017 WASM ALUMNI EVENTS

### OCTOBER 27

Atlas Copco Golf Day in support of WASMA  
Kalgoorlie Golf Course.

[wasma.com.au/event/atlas-copco-and-wasma-golf-day-kalgoorlie/](http://wasma.com.au/event/atlas-copco-and-wasma-golf-day-kalgoorlie/)

### NOVEMBER 15

MineChat in November at the Office On  
Harrogate.

[wasma.com.au/event/minechat-in-november/](http://wasma.com.au/event/minechat-in-november/)

### NOVEMBER 17

WASMA & WIMWA Family Night @ Scitech.

[wasma.com.au/event/wasma-wimwa-family-night-scitech/](http://wasma.com.au/event/wasma-wimwa-family-night-scitech/)

### NOVEMBER 25

WASMA Annual Ball

[wasma.com.au/event/wasm-alumni-annual-ball-lock-in-this-date/](http://wasma.com.au/event/wasm-alumni-annual-ball-lock-in-this-date/)



WASM ALUMNI MineChat

The Office On Harrogate, 32 Harrogate St, West Leederville  
November 15 5pm - 6.30pm



The poster features the WASMA logo in the top left corner, which includes a shield with a pickaxe, a diamond, and scales, with the motto 'De Dextris Comitibus' below it. The background is a colorful, abstract city skyline. The text 'Wasm Alumni Annual Ball' is in orange, 'On the Point' is in a cursive script, and 'SOLD OUT' is in large blue letters. Below this, the date 'Date: November 25 2017', time 'Time: 6pm - 12am', and location 'Location: On The Point 306 Riverside Drive East Perth' are listed. At the bottom, the phrase 'WE BUILT THIS CITY' is written in white capital letters.

Wasma Alumni Annual Ball  
*On the Point*  
**SOLD OUT**  
Date: November 25 2017  
Time: 6pm - 12am  
Location: On The Point 306 Riverside Drive East Perth  
**'WE BUILT THIS CITY'**



The poster features the WASMA logo in the top left corner. The background is a photograph of a person in a white lab coat using a tool on a brick wall. The text 'WASM Alumni & WIMWA-Family Night @ Scitech 17/11/17 5pm - 8pm' is in large yellow and white letters. Below this, it says 'WASMA & WIMWA members and family free', 'Non members \$60.00 per family', and 'Pizza and Drinks included'. The WIMWA logo is in the top right corner. At the bottom, the location 'Scitech City West Centre, Sutherland Street West Perth' and the booking link 'Book online <https://wasma.com.au/event/wasma-wimwa-family-night-scitech/>' are provided.

WASMA  
**WASM Alumni & WIMWA-Family Night @ Scitech 17/11/17 5pm - 8pm**  
WASMA & WIMWA members and family free  
Non members \$60.00 per family  
Pizza and Drinks included  
Scitech City West Centre, Sutherland Street West Perth  
Book online <https://wasma.com.au/event/wasma-wimwa-family-night-scitech/>



## COUNCIL NEWS

The Alumni held its AGM August 31 2017. We are delighted to welcome two new members; Ms Keren Paterson, Director of Trigg Mining and Mr Stuart Tonkin, CEO Northern Star Resources. Congratulations to Mr Raleigh Finlayson the newly elected president and Mr Christian Price, vice president. Your council is as follows.

**EXECUTIVE COMMITTEE:** Raleigh Finlayson, Christian Price, Jade Singleton, Wayne Bramwell Bentley Branch Chairman and Vic Simpson Kalgoorlie Branch Chairman

**COUNCIL:** Ken Brinsden, Stuart Tonkin, Keren Paterson, Neil Warburton, Brendan Parker, Kyle DeSouza, Phil Plaisted and COO Ann Meyer

Council would like to sincerely thank Mr Stuart Pether for his commitment to WASMA over the last seven years and for his work on the newly formed WASM Fund. To our outgoing President Mr Bill Beament, thank you for over 12 years of tireless work on council as President and Vice President, especially in realigning the alumni with Curtin University and ensuring the WA School of Mines Alumni of a long and successful future.

**THE KALGOORLIE BRANCH** held their AGM on August 30. Mr Vic Simpson is now the Kalgoorlie Branch Chairman, with Ron Ellis as VC and Secretary, Andrew Francis Treasurer, Cornelius Hattingh Events, Chalida Pascoe Memberships and Tim Campbell Sponsorship

**THE WASM ALUMNI PATRONS GROUP** is the political and lobbying arm of your alumni. Mr Norman Moore the current chairman has stepped down and Mr Bill Beament, Executive Chairman of Northern Star Resources is the new patrons Chairman. Ms Sabina Shugg has accepted the invitation to the move on to the patrons.

Your Patrons Group is the following: Bill Beament Chairman, Raleigh Finlayson, Wendy Duncan, David Flanagan, Ian Fletcher, Odwyn Jones, Ian Taylor and Sabina Shugg.

## STAY CONNECTED WITH WASMA



By joining or renewing your membership to your WASM Alumni, WASM Graduates are showing their support for the school of mines to continue as a self-sustaining educational facility that finishes world-class graduates at its prestigious Kalgoorlie and Bentley Campus under Curtin University

*But there are so many more reasons to stay connected with your WASM Alumni:*

- Members only directory and forum
- Online platform to stay in touch with fellow alumni
- National and International Chapters for networking and support
- WASMA Review: Annual magazine with all the news
- WASMA Wrap e-newsletter every quarter
- Podcasts to listen

*Nationally Recognised Member Status*

- Member AWASM postnominals
- Membership card with ID
- WASMA lapel pin

*Advocacy at a political level via the WASMA Patrons Group\**

- Access to Federal and State governments
- Targeted strategies on behalf of members to influence Federal and State Government policy

*\*WASMA Patrons: Chair Norman Moore, David Flanagan, Ian Fletcher, Ian Taylor, Odwyn Jones, Wendy Duncan and Jim Walker*

*Access to WASM Students for Vacation Work*

- Database of students available for industry work and internships

*Free Networking Events*

- Quarterly Minechats

- Technical Sundowners
- WASMA & WIMWA Diggers & Dealers Sundowner
- Annual Q & A Series at KPMG
- WASMA & WIMWA Family Night's
- Special Lectures
- Research Workshops
- Financial Workshops
- Scholarship Awards Night

*Discounted Events: 25% for paid up members*

- WASMA Graduation Long Table Luncheon
- WASMA Graduation Dinner
- WASMA Annual Ball

*Membership Services*

- TAG Financial Group: to help you find the best financial and mortgage deal in the city
- for the latest in jobs
- Hanrahan Smith, Employment Placement Partner
- BDO (accounting services))
- WA Business News RSS Feeds (via [www.wasma.com.au](http://www.wasma.com.au))
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