Vale Professor **Paul Dunn**

Professor Paul Dunn, Director of WASM passed away on Easter Saturday 2010. Paul took up his position as WASM's Director a little over two and a half years ago but this is not the first time he was part of the WASM team.

Back in 1991, he came to WASM Kalgoorlie as a young lecturer, and made a strong impression on both students and staff. He is still remembered for his love of football, music and people, as well as for his hands on approach and 'can do' attitude. In fact, on one memorable occasion, this led to him taking apart the engine of the broken down bus on a field trip, only to discover that it was simply a matter of flicking a switch over to the alternate fuel source! Paul is remembered by long-serving Kalgoorlie staff with much affection and laughter as a friend and man who knew that whatever your role, you work with people, and that is the most important thing to remember.

For those who first met Paul in his role as Director, our affection for him was just as strong, as was our admiration. I recall the first time I met Paul. He was a physically imposing person, tall and strong. From our early conversations it became apparent that he had a keen strategic mind but what impressed me most of all was his calm measured approach when dealing with people. In the demanding role of WASM director these were attributes I thought would serve him well. Indeed they did.

Unfortunately very early in his time at Curtin he was diagnosed with the illness that would eventually lead to his passing. I remember our conversation when he told me. In typical Paul fashion there was no thought of taking extended leave or wavering of commitment to his role as Director. It was simply a statement that there would be minimal impact for Curtin, even with the treatment regime, and so it proved. In the next two years he worked diligently in his complex portfolio. It required significant amounts of travel not only to Kalgoorlie but overseas as well. In the short time he had in his role he made major contributions to WASM at a time of rapid growth in its operations. He planned to position it as an internationally recognised school in resources and minerals and took significant steps in this direction.

Paul was universally admired by his staff and colleagues. This is a rare occurrence in a role involving many staff spread across two campuses particularly in an environment where difficult decisions have to be made. He was also respected by the industry people.

We are so very sad to lose him. Paul was a young, energetic man and fine leader. On behalf of all his colleagues and friends at Curtin we bid you farewell Paul.

Professor Andris Stelbovics
Pro Vice Chancellor, Science and Engineering

Director's **Note**

In the two and a half years at WASM, Paul worked hard to build on the reputation of WASM to develop it into a world class institution that encompasses best practise across Australia and internationally.

Paul established a very strong foundation from which we, who will continue what Paul began, have the challenge to progress and develop.

To remember and commemorate Paul and what he achieved for WASM, we have established a committee to determine how best to do this. The committee is currently considering staff and student scholarships and prizes that focus on initiatives that Paul established. We welcome contributions towards such commemorative initiatives from staff and industry. I would like to thank those that have already contacted us and committed their support!

In the meantime, I have been acting in the role of Director of WASM, as I have done occasionally over the past two years when Paul was unable to do so. I will always treasure the time that I was able to work with Paul, both while acting in his role, as well as in my substantive role as Head of Department of Spatial Sciences. He always had time to talk, loved to bounce around ideas and issues, and in his cheerful and friendly familiar style, would show interest and nut out how things were going across the school. His legacy will not be forgotten.

As you can see from this newsletter, there is quite a hive of activity occurring across WASM. It is great to see the recognition achieved by staff and students through awards and funding. While students wrap up their first semester examinations, the school is busy with organising a range of events to promote the school and attract a new set of high school leavers and international students. The large careers events recently held in Perth were well attended, and the Focus On Mining and Diggers and Dealers events are ramping up. In addition, AusIMM are hosting the Sustainable Mining Conference 2010 in August in Kalgoorlie. Of course, the WASM Wombats events recently held in Kalgoorlie made headline news.

As expected, we have been busy with a replacement for the Director role. In the course of our extensive recruitment process, we invited a strong potential candidate, Professor Stephen Hall, from Laurentian University, Canada, to visit us and he spent a week at Curtin visiting both the Bentley and Kalgoorlie campuses. Steve has a wide international experience in mining education and research. He completed one of the first Masters by research programs in metallurgy at Kalgoorlie in the early 1980s and was Head of Science and Engineering at the University of Ballarat prior to moving to Canada. We are delighted to announce that Professor Hall has accepted the position as Director of WASM and expect that he will be able to commence in the position around August or September of this year. We will provide further information in our subsequent newsletter, as more details come to hand.

Professor Bert Veenendaal
Acting Director, WASM

Our **Departments**

Metallurgy News

Professor Eric Grimsey attended the The Metallurgy Society (TMS) Annual Conference in Seattle, USA this Feb 14-18. The Conference was attended by minerals industry professionals and academics from around the world. Professor Grimsey co-presented a short course entitled "Process Modelling – Spreadsheets and Beyond".

Two PhD students in the Department have been awarded a 2010 MERIWA Scholarship: Simon Assmann and David Grimsey. Simon, who also received the award last year, is investigating 'Improving Mass Transfer in Electrostatic Liquid-Liquid Extraction (ELX) Contactors'. He is in the second year of his PhD studies. David is also in the second year of his PhD studies and is researching the 'Application of Segregation Roasting to Western Australian Laterites'.

The following PhD applicants in the Department of Metallurgical Engineering have been awarded an Australian Postgraduate Award (APA) Scholarship for 2010:

James Didovich

Mr Didovich's project, entitled 'Modelling of an electrostatic liquid-liquid extraction column', aims to provide an improved understanding of electrostatic liquid-liquid extraction to further the journey towards industrial application of this technology.

Majid Sarvi

Mr Sarvi's area of research is 'Mathematical Modelling of Falcon Centrifugal Gravity Concentrators'. These newly developed enhanced gravity concentrators (EGCs) employ centrifugal acceleration to enhance the settling rate of particles and will have uses in the gold, coal and base mineral industries. The Falcon is superior to the Knelson in its low usage of fresh water, and its greater recovery of fine particles.

Andrew Simons

Mr Simons' project is entitled 'Recovery of copper and cyanide from gold tailings'. He is modelling a cyanide recycling and copper recovery process for gold plants with high levels of cyanide soluble copper.

Tracy Wilson

Ms Wilson's project is a study of the hydrometallurgical processing of gold ores containing high concentrations of silver. She aims to determine the causes and develop strategies for addressing the problems associated with the extraction of precious metals from silver rich gold ores, including low silver extraction efficiency.

Spatial Sciences

In a project between Curtin University (Spatial Sciences and Computing) and UWA (Centre for Exploration Targeting), eye tracking is being used to quantitatively study geological target spotting. In prospectivity analysis for mineral exploration, geoscientists frequently analyse multiple, noisy and incomplete datasets comprising geological, geochemical, geophysical and remote sensing data. Such analysis is a largely subjective process as their interpretation of data is significantly governed by prior knowledge and experiences as demonstrated clearly from human analysis outputs of seismic data. The study aimed to quantify and analyse the variations in data interpretation that exist amongst individual geoscientists using an eye tracking system. The specific aims are twofold: (1) examine the variation in their ability to spot targets that are specific geological features within aeromagnetic data; and (2) determine the effectiveness of a data enhancement method that is commonly used for the interpretation.

Six geoscientists with various skills and expertise were involved in the visual analytic tasks. It was found that those with greater experience were more methodical in their search for targets, usually scanning larger areas compared to the less experienced subjects. The ability of test subjects to detect faults, with or without the enhancement method was clearly strong. All subjects identified significant features, although it was noted that different subjects tended to focus on different features. A paper has been published: February, 2010.

New Staff

Dr Ashraf Dewan has joined The Department of Spatial Sciences as a lecturer in GIS. He has relocated to Curtin from the Department of Earth and Environmental Science at Nagoya University in Chikusa, Japan. Dr Dewan obtained his PhD in Environmental Management from Okayama University in Japan after completing Honours and Masters qualifications at his home university at the University of Dhaka in Bangladesh.

Exploration Geophysics

Head of Department Boris Gurevich

Professor Boris Gurevich has been appointed Head of Department, Exploration Geophysics. Professor Gurevich received his MSc in exploration geophysics from Moscow University in 1981, and his PhD in geophysics from the Institute of Geosystems in Moscow in 1988. From 1981 until 1993 he worked as a researcher for the Institute of Geosystems. Professor Gurevich was a visiting scientist at the Geophysical Institute of Karlsruhe University (1992-1993) and at Birkbeck College of London University (1993-1994), which was followed by a position as a research geophysicist at the Geophysical Institute of Israel from 1995-2000. Boris is also the Director of the Curtin Reservoir Geophysics Consortium (CRGC). His research interests include seismic and acoustic properties of fluid-saturated rocks and other porous materials, and seismic imaging. He is a member of SEG, AGU and EAGE.

New Zealand ironsand exploration and resource definition using Ground Penetrating Radar (GPR)

WASM honours student David Stannard recently completed a project which tested the viability of low frequency GPR for delineating ironsand ore zones in recently discovered dune deposits that occur along the west coast of New Zealand's North Island. The project is sponsored by Sinosteel

Australia PL and is being carried out through the Centre of Excellence for High Definition Geophysics (CHDG) in the Department of Exploration Geophysics. The project supervisor is Dr Jayson Meyers in collaboration with Dr Roman Pevzner.

Ironsand is currently being mined by BlueScope Steel at the Waikato Heads and Taharoa mines, where titanomagnetite is extracted from the ironsand deposits to make a magnetic concentrate. About 3 to 4 million tons of concentrate are produced annually, with half used locally to produce steel products, and the rest exported to specialised steel mills adapted to the fine grain size and additional metals of titanium and vanadium.

Sinosteel Australia recently drilled aeromagnetic anomalies near the Aotea headland, and discovered a series of ironsand deposits perched on elevated volcanic ash and lava deposits associated with the Karioi volcanic zone. The depositional pattern of these dunes is complex, and the modern topography has no relationship to the thickness of the ironsands due to deposition on an undulating palaeosurface and geologically recent erosion.

While the drilling by Sinosteel is closely spaced on a nominal 100 by 100 metre pattern, the internal geometry and thickness of the high grade sand layers is quite variable over short distances. Therefore, GPR was tried at several prospect areas to image reflections within the ironsand deposits. Experimentation was carried out on test lines to determine the best antennae configuration, digital sampling parameters and survey methods, before large areas were surveyed using grid patterns. High end data processing was carried out in the laboratory using software designed for oil and gas exploration by seismic methods.

The results were outstanding in most of the survey lines, and the GPR data provided the type of information that Sinosteel needed to better understand the depositional history of the dunes, continuity of high grade ironsand packages between boreholes, and provide very detailed geological information for future mine planning. David's presentation on his research was voted the best presentation at the 2009 ASEG Student Night. The data processing and interpretation is continuing beyond the completion of the Honours project in order to assist Sinosteel with improving confidence in their resource models and bring them to a higher JORC category.

Congratulations to **Dr Maxim Lebedev**, who has been awarded a grant of 17K for 1 month with Total Marine Technology Ltd to conduct a feasibility study for *Experimental and Theoretical Investigations of the principles of the density measurements using ultrasonic technique Tool for Remote Measurement of the Density of Cement Slurry.*

MERIWA Scholarship: Has been awarded to **Mr Andrew Greenwood** who is currently entering his third year of PhD studies in the Department of Exploration Geophysics at Curtin University. Andrew's thesis topic is *"Application of Vertical Seismic Profiling for Characterisation of Hard Rock"*, which is being supervised by Associate Professor Milovan Urosevic.

Mining and Surveying

Professor Roger Thompson is developing a haul roads training course for remote and regional mine-site staff. Currently, state-of-the-art courses are not easily accessed by remote sites and as a result, technology transfer and staff skills-enhancement is problematic. The project will establish collaborations with other areas of expertise in WA, including DME and ARRB, together with local equipment supply companies.

The Caterpillar Foundation has awarded $65 000 to assist with the development of a training course tailored to individual mine site locations, where employees involved in mine road design and construction can further develop their skills and knowledge-base. Besides certification for skills learned, participants will improved their skills transferability, gain a broader knowledge base and will have an appreciation of their skills in the broader context of energy efficiency, carbon pollutant reduction, safety, health and the local environment.

In the long term, Professor Thompson's project can be expected to significantly contribute to the development of an experienced manpower base for the industry and encourage a skills transferability culture to overcome the problems associated with vocational training in regional and remote locations. In addition, participation in these courses will generate an awareness of individual contributions to safety, health and environmental responsibilities through an understanding of the broader context of the advanced skills developed in road design.

Professor Thompson and Associate Professor Andrew Jarosz attended the SME 100 Years in Mining Research Conference and AGM in Phoenix, Arizona from Feb 28 – March 3. Professor Thompson presented his paper "Mine Haul Road Design and Management Best Practices For Safe and Cost-Efficient Truck Haulage".

New **Staff**

Dr Dincer Erer joins WASM's Mining Department after more than fifteen years in the Australian mining industry, where he worked in the gold, nickel, diamond and mineral sands sectors. He has extensive experience in quarry management, pre-feasibility and feasibility studies, in mine planning, mine design, scheduling, cost estimate and business plans. Dr Erer took his undergraduate degree at Technical University of Istanbul, Turkey, and his Masters and Philosophy degrees at the University of Nottingham, England. Dr Erer joins us as lecturer in Mine Geotechnical Engineering for fourth year students and is passionate about providing high quality education based on industry experience.

Claire Doughty joins us as Administrative Assistant for the MEA program. She has a BA Business (Hospitality Management) from La Trobe University, Wodonga Campus, Victoria and has lived in Kalgoorlie for almost 2 years, previously working as a receptionist at the Accor All Seasons Kalgoorlie Plaza.

Applied Geology

Professor Zheng-Xiang Li of the Department of Applied Geology has developed and successfully conducted a trial postgraduate field workshop entitled "Geological History of Eastern South China in Eight Days". Staff and graduate students from two top Chinese institutions – Zhejiang University and Nanjing University participated in the pilot workshop, which included a single day of indoor lectures and a seven-day fieldtrip. The course gives an overview of the tectonic history of eastern South China and participants are provided with a comprehensive, sixty-five page, field-guide.

After the succes of the pilot, this short course will be further developed in 2010-2011 with the intention of bringing together Curtin students and staff with colleagues from collaborating Chinese institutions. This will provide opportunities to establish potential collaborative research projects and attract future students to WASM, as well as giving postgraduate students a valuable learning experience. Applied Geology currently has three PhD students from China, and there will be at least six more arriving in 2010. Almost all of these students are jointly funded by scholarships awarded by the China Scholarship Council and Curtin University, a venture supporting collaborative programs with Chinese researchers.

Our **Students**

The WASM Careers Fair in Kalgoorlie went off with a bang on 12 March, with 17 major mining companies attending the event designed to educate students on their career options. The Careers Fair provides employers with a very well targeted group of students to talk to and gives students the chance to make contacts and kick off their careers.

AusIMM New Leaders Conference – Success in a New Financial World

The 2010 AusIMM New Leaders' Conference was held in Kalgoorlie on April 6-7, and examined the strategies being deployed by mining companies to sustain operations through and beyond the current instability and uncertainty. The conference focused on all disciplines of the mineral industry and sought to examine efforts made by mining companies to ensure survival through, and beyond, the financial crisis. The two day conference included social and networking functions and mine tours.

WASM Wombats /International Mining Games

The International Collegiate Mining Games were hotly contested in Kalgoorlie on April 8-10, ending with an awards banquet at the Kalgoorlie Town Hall. In Kalgoorlie for the third time, the Games are held in memory of the 92 miners who lost their lives in the Sunshine mine disaster in 1972, and have now been running for 31 years. The Games were held at the Miners and Prospectors Hall of Fame and attracted 43 teams of mining students from all over the United States, England and Australia. Contestants competed for the coveted trophies using old-school mining techniques such as hand steeling, mucking, and airlegging.

After their landslide win at the 2009 Mining Games in Butte, Montana, the pressure was on for a big performance in 2010. The Wombats delivered on their promise, dominating the field in all divisions and taking out a top three placing in almost all events.

The WASM Wallabies (WASM's Bentley team) took out overall first place, closely followed by the WASM Wombats. The WASM Wombats took out second in the Women's division, pipped at the post by Mackey. In the Co-Ed division, WASM Wombats romped home in first place, followed by Rolla in second.

The WASM Wombats' would like to give a big thank you to their sponsors, especially major sponsors Rio Tinto, Westrac, Anglogold Ashanti and RUC, as well as the Hall of Fame; their fantastic support made the Kalgoorlie International Mining Games possible.

Our Graduates

CME Women in Resources award

WASM graduate Sabina Shugg was awarded "Women in Resources Champion 2010" at the Chamber of Minerals and Energy (CME) Women in Resources awards held on International Women's Day this March. The award recognises Ms Shugg as an outstanding role model to people in the resources industry and the broader community. Her work to promote the role of women in the resources sector has made a significant impact on the Western Australian Mining industry, particularly her establishment of the Women in Mining and Resources Network in WA (WIMWA), which currently has 1050 members. Ms Shugg is also an active AusIMM member and an active member on the WASM Graduates Association's management committee.

AusIMM Awards for 2009

WASM Graduates Peter McCarthy and Helen O'Keefe were recognised at the AusIMM Awards for 2009. Mr McCarthy won the Beryl Jacka Award, presented in recognition of extraordinary and sustained service to The AusIMM. Ms O'Keefe was presented with the New Professionals Award which recognises the contribution by a New Professional to the minerals industry (generally within six years), through operational, academic, service or other notable achievement.

Our Community

Scitech Science Career Fairs

On March 24-26, the Mining Hall of Fame was packed to the rafters with Scitech's Science Careers Fair. Designed to encourage primary and high school students to continue their studies in maths and science, the event showcased the many ways in which these two disciplines pervade our lives. The AusIMM and WASM collaborated to provide a series of presentations to students and hands on activities, with a Mine Ventilation fan to allow students to measure wind velocity, a point load rock strength test machine from the Rock Mechanics Group, and surveying from the Mining Department. Staff from the Faculty of Science and Engineering on Bentley campus, also travelled to Kalgoorlie to bring activities from the Engineering and Chemistry disciplines. Over 1500 students from the Goldfields, some from as far as Leonora, stopped by to try their hand at engineering and mining activities and went away with some new ideas for their futures.

If you have any events or research news for our next issue or would like further information on any of this issues stories, please email Karyn at k.lovatsis@curtin.edu.au