

From the Research Director

I am very pleased to be preparing this report from a new office at Monash, as a result of the Centre Administration and Monash-based Centre staff occupying renovated office space designed to better showcase the Centre at Monash. Located adjacent to the new Monash Centre for Electron Microscopy and within easy reach of most laboratory facilities, the new base sees the first genuine consolidation of Monash Centre staff. We are grateful for the support from Monash University for this development.

The Centre's steadily increasing international engagement with China has been a recurring theme of recent reports and this is to be no exception. We are very pleased to welcome two members of the technical staff from the Aluminum Corporation of China Limited (CHALCO) in June: Dr Fuan Guo from the Suzhou Institute for Nonferrous Metals Research, and Mr Na Jiang from Southwest Aluminum. Both will work with the Centre for 12 months as Visiting Scholars at Monash. In closely-related activities, we also have two visiting research students from Central South University, Mr Yong Zhang and Mr Shengdan Liu, both supported by the China Scholarships Council.

Undoubtedly the highlight of the past few months has been rapid progress in our discussions with CHALCO, culminating in the signing of an agreement between CHALCO and Monash University to establish the Australia-China International Centre for Light Alloy Research. A framework Centre Agreement was executed in Beijing on 29 September, 2007, and I am very grateful to Monash Vice Chancellor, Professor Richard Larkins and DVC (International), Professor Stephanie Fahey, for making a special trip to Beijing for what proved to be a very high profile event.

Under the terms of this Agreement, Monash University and CHALCO are the lead institutions, but the Agreement makes provision for member institutions within the ARC Centre and for CSIRO to be engaged as founding partners. I am also very grateful for the warm support of the Chair of the Centre Advisory Board, Dr Colin Adam, and Director of the CSIRO Light Metals Flagship, Dr Raj Rajakumar, both of whom attended the signing ceremony. Potential CHALCO partners include Central South University, Chongqing University and Shanghai Jiao Tong University, all of which were also represented.

On the domestic front, it is pleasing to note the major successes of Centre staff in this year's ARC LIEF grants. A special congratulations to Nick Birbilis and Graham Schaffer on their key leadership roles. The Centre's ability to compete at the highest international levels in research is vitally dependent on an ongoing investment in major infrastructure and, in the absence of direct Centre funding for this purpose, the efforts of individual researchers is crucial and to be much appreciated by all who benefit from their efforts.

In a closing note, let me remind you of the Centre's Annual Workshop at UNSW (4-5 December, 2007) and encourage as many as possible to attend and participate. This year's event will see the first full coverage of the Centre's research portfolio. A highlight will again be the Ian Polmear Lecture, to be delivered this year by Professor John Humphreys from the University of Manchester. We anticipate additional strong international participation, including Professors Hamish Fraser and Yunzhi Wang from Ohio State University, and representatives from CHALCO and their partner institutions in China. I look forward to seeing you there.



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Centre Visitor



Dr Fuan Guo, from the Suzhou Institute for Nonferrous Metals Research of Chalco (Aluminum Corporation of China) is currently visiting Monash University for 12 months.

Fuan studied and worked in France for over 5 years. He obtained his PhD in ENSAM of Paris (Nationale Supérieur d'Arts et Métiers de Paris) in 2001, and then worked in Reims University for over 2 years.

During his work in France, Fuan mainly engaged in research on the residual and internal stresses of γ -TiAl based alloys and on the thermal properties of nanomaterials. He published over 20 papers on intermetallics and on the thermal properties of nanomaterials in international journals such as *Acta Mater.*, *Thermochimica Acta*, *Mater. Chim. Phys.*, etc.

Fuan works at the Suzhou Institute for Nonferrous Metals Research of Chalco since 2004. He leads a research group to engage in the study of aluminum alloys for automotive applications. He also engages in research on Cu-based alloys for lead frame applications.

Dr Guo's group performs the alloy design, mechanical testing, microstructural characterisation and processing improvement. Most of the programs are related to the development of new generation alloys for automotive and for lead frame applications.

Fuan is married with one child. In his spare time, he enjoys traveling and reading classic French novels.

Dedicated Back Pressure Equal Channel Angular Processing Facility at University of Melbourne

A dedicated back pressure equal channel angular processing (BP-ECAP) facility has been established at the University of Melbourne. The facility is designed to carry out consolidation of particles by severe plastic deformation as well as ECAP of bulk materials. Although the capacity of the press is only 20 tonnes (both forward and back pressures), multiple passes can be conducted efficiently at variable speeds and at temperatures up to 650°C.



It is being used to process a range of engineering materials including Al, Mg and Ti based light alloys and composites, amorphous alloys, Fe based alloys, intermetallic alloys as well as polymers and their composites. With the ongoing design of tooling, it will eventually be able to process materials at up to 1000°C. The facility is a significant boost to the CoE project "Design and Synthesis of Nanostructured, Multiphase Light Alloys and Composites for Enhanced Performance" which aims at significantly improving mechanical properties of existing light alloys including room temperature strength and ductility and high temperature creep resistance and achieving a good combination of these properties. Some promising results have already been achieved although the project is still in its early stages.

Establishment of Australia-China International Centre for Light Alloys Research

On the 29th of September the Vice-Chancellor of Monash University, Professor Richard Larkins, signed an agreement with the President of the Chinese Aluminium Company (CHALCO), Dr. Yaqing Xiao, to establish the Australia-China International Centre for Light Alloy Research. This agreement was strongly endorsed by the Australian Minister for Education, Science and Training, Julie Bishop and the Premier of Victoria, John Brumby.



Monash Vice-Chancellor Professor Richard Larkins at the signing ceremony for the Australia-China International Centre for Light Alloy Research

The signing was a very high-profile event at the Diaoyutai State Guest House, attended by Vice Ministers from the Ministry of Education, Ministry of Science and Technology, and State Council, and various other senior officials from China. Australia was well-represented by senior officials of the Australian Embassy and the State Government of Victoria.

To further develop this collaboration, the CoE has offered an Honorary Appointment as 'Senior Advisor - China International Relations' to Professor Yi-Bing Cheng from Monash University. Yi-Bing has been instrumental in fostering this initiative to date and will continue to provide invaluable assistance in developing the Centre's engagement with China.

Titanium Workshop

On 17 August 2007 Professors Xinhua Wu and Mike Loretto of the Interdisciplinary Research Centre in Materials Processing at the University of Birmingham conducted a workshop at The University of Queensland. They gave presentations ranging from the physical metallurgy of titanium alloys to research facilities at the IRC and the latest developments in net-shape manufacturing of large titanium components for the aerospace industry. Twenty four researchers from Melbourne, Sydney and Brisbane participated in the workshop.

IP Workshop

On August 9-10, a team of CoE personnel attended a special IP and Commercialisation workshop at Rydges Southgate in Brisbane. The workshop was administered by UniQuest, the University of Queensland's commercialisation company. It was a very valuable workshop emphasising the key points relating to IP protection and subsequent technology commercialisation, with an emphasis on the outcomes of early stage research. Topics covered included IP protection, Patents, Designs and Trademarks, Trade Secrets, Copyrights - not to mention a number of interactive group activities and team exercises. Certainly a valuable workshop!

Monash CSIRO Collaborative Research Support Scheme

Dr Dacian Tomus from Monash University and Dr Peter Lynch from CSIRO were successful in their application under the Monash-CSIRO Collaborative Research Support Scheme. Dacian and Peter have received ~\$36,000 to work on a project aimed at understanding the effect of hydrogen on the fine scale deformation behaviour of titanium and Ti-64 alloys. The application was considered to be of the highest quality and a priority for growing strong Monash-CSIRO collaborations.

ARC LIEF grants

The Centre was extremely successful in the latest round of ARC LIEF grants:

1. A Monash application led by Nick Birbilis received \$750k for an Ion Beam Nanofabrication and Characterisation Facility for advanced materials research.

This will facilitate the purchase of a much-needed Focused Ion Beam microscope which will be housed in Monash's Electron Microscopy and Microanalysis Facility. RMIT and Deakin University are co-contributors to this facility.

The Quanta 3D FEG microscope for 3D nanocharacterisation, prototyping and analysis.



2. Nick was also involved in the successful bid for \$588k for an optical profiling system which is used to provide accurate, non-contact surface metrology for advanced materials applications.

The instrument will be located at the University of Melbourne but also provides access for CSIRO MMT and Monash University.

3. Graham Schaffer from the University of Queensland was awarded \$580k for a National Facility for Light Metal Powder Processing.

The Facility will provide the critical level of investment and the strategic national focus necessary to achieve competitive advantage in powder metallurgy processing.

Collaborators on this application were UNSW, Deakin University and Melbourne University.

4. Deakin University was the sole recipient of \$440k to purchase a multidisciplinary 'environmental' field emission gun scanning electron microscope.

This high-resolution SEM will be used in the development of new materials for the automotive, textile and bio-medical sectors.

Annual Centre Workshop

A reminder that the second annual workshop of the ARC Centre of Excellence for Design in Light Metals will be held on Tuesday 4th and Wednesday 5th December 2007 at the University of New South Wales in Sydney. All Centre research staff, students and affiliates are encouraged to attend the workshop to discuss current research initiatives and future research programs. A program will be issued in due course.

To register your interest in attending, please complete the registration form and fax (+ 613 9905 4940) or email (Astrid.Nordmann@eng.monash.edu.au) Dr Astrid Nordmann, **no later than Friday 9th November**.

Two poster sessions will be held over the course of the Workshop with prizes awarded for the top two student and staff posters. All researchers, but most particularly postgraduate research students, are invited to submit a poster presentation outlining their existing or planned research activity.

If you are intending to submit a poster, please send an abstract to Dr Astrid Nordmann, **no later than Friday 26th October**. There will also be an opportunity for poster presenters to give a brief (2 to 3 minute) oral overview of their poster prior to the poster session. Please note that giving such an overview is entirely voluntary.

Information on accommodation (including prices and booking information) can be accessed via:

<http://www.venuesandevents.unsw.edu.au/accom/accomindex.html>

New CoE headquarters

In early September, CoE staff and students at Monash University relocated into a newly renovated building on the Clayton campus. As well as providing a base for Centre Administration staff, the refurbished area also houses the Centre's Research Fellows, postgraduate students, technical staff and international visitors. Please come and visit us in Building 27 next time you are on campus!



The newly refurbished building of the CoE at Monash University.

Upcoming conferences

Titanium & China Conference 2007

21-23 October 2007, Beijing, China
www.metal-pages.com

PRICM-6

Sixth Pacific Rim International Conference on Advanced Materials Processing

6-9 November 2007, Korea
www.pricm-6.org

INCAL 2007

21-23 November 2007, Hyderabad, India
www.aluminium-india.org

TMS 2008

9-13 March 2008, New Orleans, USA
www.tms.org.au

International Magnesium Association 65th Annual World Conference

18-20 May 2008, Warsaw, Poland
www.intlmag.org

Aluminium China 2008

28-30 May 2008, Guangzhou, China
www.aluminiumchina.com

Titanium 2008

September 21-23 2008
Las Vegas, USA
www.titanium.org

ICAA11

11th International Conference on Aluminum Alloys
22-26 September 2008, Aachen, Germany
www.dgm.de/icaa11

MS&T '08

5-9 October 2008
Pittsburgh, PA, USA
www.matscitech.org

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Staff & student profiles

This issue's staff and student profiles are **Pavel Cizek** at Deakin University and **Sally Goh** at Monash University.



Pavel Cizek is a Research Fellow based at Deakin University in Geelong. Pavel's research interests have been focused on the physical metallurgy of hot and cold plastic deformation, static and dynamic softening processes, solidification and solid state phase transformations in a range of ferrous and non-ferrous metallic materials.

He has mainly used transmission and scanning electron microscopy complemented by electron backscatter diffraction (EBSD) in his research activities. His current research interest is to investigate the microstructure evolution in magnesium alloys using advanced electron microscopy techniques.

Pavel is single and in his spare time enjoys playing tennis and table tennis, watching movies, in particular art movies, comedies and westerns, and he also follow football games, in particular those from the European Champions League.



Sally Goh is a PhD student at Monash University and her research activities have centered on the microstructural design of engineering light alloys, typically the thermal processing of aluminium alloys such as precipitation hardening process and age-hardening kinetics.

Her past research projects include atomistic modeling of aluminium alloys and RF magnetron sputtering of thin films on substrate, its heat treatments and characterisation.

Her current work on Al-Mg-Si-Cu automotive sheet alloy 6111 involves the study of precipitation behavior, effects of alloying elements, and the application of transmission electron microscopy and atom probe field-ion microscopy techniques for the determination of crystal structures and identification of phases.

Sally comes from the exquisite Penang Island in Malaysia and completed her undergraduate studies at the Department of Materials Engineering at Monash University. She lives with her partner Evan Lancaster, who is a designer at GM Holden. She has two adorable cats, Eugene and Cormack, and in her spare time she enjoys hiking, canoeing and camping. She also has ample fishing skills, plays the chinese bamboo flute and loves to draw.



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