

From the Office of the Director

As my first year as Director of the Centre of Excellence draws to a close it is my pleasure to reflect on the Centre's activities over the last 12 months.

Not only has the Centre maintained a high profile in its traditional strength areas of materials characterisation and alloy development, but it has also started to diversify into new areas of research such as net shape manufacturing and laser additive manufacturing. This year the Monash node of the Centre has been busy preparing for these new activities and, in addition to securing a long term lease on nearby factory space, has taken receipt of a large cross-section EDM and various ancillary pieces to enable advanced powder processing and is expecting delivery of an EOSINT M 280 Direct Metal Laser Sintering (DMLS) Machine on the 10th of December 2011. The Trumpf blown powder machine is scheduled to be delivered at the end of January of 2012. In April 2012 we also expect the delivery of the world's largest laser powder bed machine.



The most exciting news is perhaps our success in the latest round of ARC LIEF grants where Prof. Peter Hodgson received funding for an Atom Probe facility and Monash received funding for purchasing an ultra-high-pressure HIP which is big enough for HIPping medium-sized components as well as powder-processed samples. The other participating partners in the HIP LIEF grant are UWA, UQ, RMIT, DMTC. The above facilities will greatly expand the activities of the Centre. With the installation of the Trumpf blown powder machine, the Centre will be well placed to contribute to the EU Framework 7 "Accelerated Metallurgy" project in which the CoE is an official partner. You will recall from our previous newsletter that this is a European Union project funded under 7th Framework Programme and that Associate Professor Nick Birbilis has been appointed the official Australian coordinator for this project.



The Centre was delighted to host the first international near-net shape manufacturing conference in Melbourne in the first week of November, as well as its annual conference later that month. We enjoyed very productive discussions with international and local visitors during both these events and look forward to progressing those collaborations in the future. We will certainly be holding a second net-shape conference in early 2013, and details will be announced by the middle of next year. At the Centre's conference it was particularly exciting to launch the inaugural Centre of Excellence Awards for Best

Picture, Best Thesis, Best Paper and Best Idea and I would like to thank all contributors and congratulate again all those who were prizewinners. You will find a full article on this conference, and the prizewinners, in this edition of Altima. A Centre calendar for 2012 has been produced from the 13 best images and we hope that this will become an annual publication from the Centre. I encourage all Centre participants to start thinking about their submissions for these awards next year.

Three of our younger researchers (or former researchers) have been recognised for their outstanding contributions to their fields in the recent announcements from the ARC. I would like to add my congratulations to Dr Philip Nakashima for his Future Fellowship and Drs. Peter Liddicoat and Kevin Laws for their DECRA's. In the round of Discovery grants, I would also like to congratulate Professors Yuri Estrin and Michael Ferry on their successes. Finally I would like to thank all Centre staff, students and associates for their continued dedication and commitment to the Centre, and especially for the support given to me in my first year as Director. I wish everyone a safe and happy holiday season. I know that next year will be an exciting time for all of us and I look forward to seeing you all again in 2012. **Xinhua Wu**, Director

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2012 calendar

An electronic version of the Centre's 2012 calendar is available for download from our website:

www.arclightmetals.org.au

Visitors from the India and Canada

Professor Atul Chokshi, from the Indian Institute of Science, Bangalore was in Brisbane for a month, collaborating with Dr Caceres on work related to the mechanical properties of Mg alloys. Prof Chokshi is the Chairman of the oncoming ICSMA 16, to be held in Bangalore in August 2012. In the photo below, Atul (left) is sharing dinner with Dr Caceres and his team of dedicated students and research staff.



The Centre is also hosting a visit from **Jayant Jain** from The University of British Columbia to work on one of the Centre's projects on magnesium. This is a shared appointment between Deakin University and the Canadian MagNeT group.

Congratulations!

Congratulations to **Philip Nakashima** for receiving a Future Fellowship for his project entitled 'Interatomic bonding in aluminium alloys'. Philip will receive over \$600k over the next five years to progress this work, which proposes a new theory about the formation of strengthening precipitates in alloys.



The Australian Government announced the creation of the Future Fellowships scheme in 2008 to promote research in areas of critical national importance by giving outstanding researchers incentives to conduct their research in Australia. The aim of Future Fellowships is to attract and retain the best and brightest mid-career researchers. At present many highly qualified mid-career researchers choose to work overseas to further their careers due to lack of opportunities in Australia. The Future Fellowships scheme addresses this problem and significantly boosts Australia's research and innovation capacity in areas of national importance.

Net-shape conference

The Centre of Excellence recently held its first annual conference on 'Near-net shape manufacturing' during 1st-3rd November. The conference was attended by approximately 40 delegates from Australia and overseas and provided a great opportunity to discuss recent developments in net-shape manufacturing, including HIPing and laser deposition. The presentations include those from NASA, EADS/Astrim, Avio, Microturbo, Concept laser, Trumpf, CSIRO and several academic institutions.

Delegates also enjoyed a conference dinner at the Melbourne Aquarium, the opportunity to become immersed in the Melbourne Cup horse race, and a BBQ at the home of the Centre's Director, Professor Xinhua Wu. It is intended that the conference will become a biennial Centre event, so we look forward to hosting it again in early 2013.

Centre Director **Professor Xinhua Wu** at the opening session of the International Conference on Net-Shape Manufacturing.



Annual CoE conference

The annual conference of the Centre of Excellence was held at The University of Melbourne on the 29th and 30th of November. It was attended by over 100 delegates including representatives not only from the Centre's participant universities but also from Ohio State University, The University of North Texas, The University of Manchester and The University of Sheffield. It was particularly pleasing to host Andy Woodfield from General Electric as this year's 'Ian Polmear Speaker' with Andy giving a talk on 'Opportunities in Titanium'.

Dr. Andy Woodfield from General Electric presenting the 2011 'Ian Polmear' Lecture at the Centre's Annual Conference.

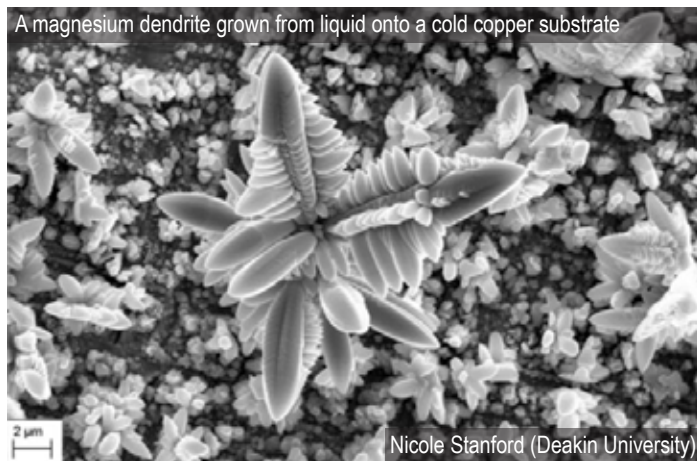


Annual awards

The Centre's annual conference provided an ideal forum in which to announce the winners of the Centre's inaugural 'Centre Awards' in the categories of *Best Picture*, *Best Thesis*, *Best Paper* and *Best Idea*, in addition to the usual *Best Poster* presented during the conference. Congratulations to the following winners in each category:

BEST PICTURE

1. **Dr. Nicole Stanford** (Deakin University) - \$500
2. **Dr. Dacian Tomus** (Monash University) - \$300
3. **Dr. Peter Liddicoat** (The University of Sydney) - \$100



The winning image from the 'Best Picture' category.

The twelve finalists in the 'Best Picture' category have been made into a 2012 Centre calendar.

BEST PAPER

1. **Dr Peter Liddicoat** - \$2000
"Nanostructural hierarchy increases the strength of aluminium alloys"
Nature Communications
2. **Dr Philip Nakashima** - \$1000
"The Bonding Electron Density in Aluminum"
Science
3. **Weizhong Han** - \$500
"On the reversibility of dislocation slip during cyclic deformation of Al alloys containing shear-resistant particles"
Acta Materialia

BEST THESIS

1. **Yuman Zhu** (nominated by Jian-Feng Nie) - \$3000
"Microstructural characterization of Mg-Y-Zn based alloys"
2. **Alireza Ghaderi** (nominated by Matthew Barnett) - \$1500 (equal second place)
"Influence of grain size on twinning in two hcp metals"
Oday Al-Buhamad (nominated by Michael Ferry) - \$1500 (equal second place)
"Accumulative roll bonding of multilayered aluminium alloys"

BEST POSTERS

Staff

1. **Sofiane Terzi** - \$500
Nucleation in liquids and solids: 4-D characterisation by in situ microtomography
2. **Wei Xu** - \$250
Promoting uniform ultrafine/nano-duplex structure in beta Ti-20 wt% Mo by severe plastic deformation

Student

1. **Karl Shamlaye** - \$500
Magnesium-rich BMGs in the Mg-Ag-Ca-Cu system
2. **Xian Zhou** - \$250
Kinetic stability of aluminium

Attendees enjoying discussions during the Poster Session at the Centre's Annual Conference.



BEST IDEA

There was no winner in the *Best Idea* category this year due to too few submissions being received. It is hoped that more submissions will be made for the 2012 award in this category.

Centre staff, students and affiliates at St. Hilda's College (The University of Melbourne) during the Annual Conference.



New staff members

The Centre is pleased to welcome several new staff members to its fold. **Dr. Bao Zhang** recently completed his PhD at the National University of Singapore on impact deformation of metals and has joined the research team at The University of Queensland. In Brisbane, Bao will be part of the research project on mechanical properties of hpdc Mg castings.

Dr Takanori Sato joined the Australian Centre for Microscopy & Microanalysis at The University of Sydney. Takanori is an Atom Probe Engineer originally from Japan, but he has lived in New Zealand for 20 years. Takanori graduated from the University of Canterbury, Christchurch, with a Bachelor in mechanical engineering in 2004 and then received his PhD in 2009 for a project on the hightemperature properties of light alloys. Before joining the ACMM team in mid-May this year, Takanori worked at the University of Canterbury for a stint of lecturing, as well as keeping the electron microscopes running. He is putting these diverse skills in teaching and microscopy to good use as he trains users in the science of atom probe tomography.



And lastly, we are pleased to welcome **Ms. Belinda Hofmeyr** as the new Senior Administrative Officer in the Centre, following the departure of Ms. Edna Tan. Belinda is originally from South Africa and has spent time working both there and in the UK in a variety of administrative roles.

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altima@eng.monash.edu.au

Or visit the "Publications" section of the Centre's website at www.arlightmetals.org.au and fill in the subscription form.

Upcoming conferences

ICAMR 2012
International Conference on Advanced Material Research 2012
21-23 January 2012
Chongqing, CHINA
www.icamr.org

TMS 2012
11-15 March, 2012
Orlando, Florida, USA
www.tms.org/meetings/annual-12/AM12home.aspx

2nd European Titanium Conference
27-28 March 2012
Somerset, UK
www.titaniuminfogroup.co.uk/view-event.php?id=78

13th International Conference on Aluminium Alloys (ICAA13)
3-7 June 2012
Pittsburgh, USA
www.neon.materials.cmu.edu/rollett/ICAA13-Site/index.html

Powdermet 2012
International Conference on Powder Metallurgy and Particulate Materials
10-13 June 2012
Nashville, USA

9th International Conference on Magnesium Alloys and their Applications
8-12 July, 2012
Vancouver, Canada
www.magnesium2012vancouver.com

Titanium 2012
7-10 October, 2012
Atlanta, USA

Aluminium 2012
9th World Trade Fair and Conference
9-11 October 2012
Düsseldorf, GERMANY
www.aluminium-messe.com

Contact the Centre

Please direct enquiries to:

Dr. Astrid Nordmann
Chief Operating Officer

Monash University
Wellington Road, Clayton, VIC, 3800

Tel: +613 9905 5791
Fax: + 613 9905 4940

Email: astrid.nordmann@monash.edu
Website: www.arlightmetals.org.au