UNSW
THE UNIVERSITY OF NEW SOUTH WALES

School of Materials Science and Engineering Annual Report 2011

Never Stand Still

Faculty of Science

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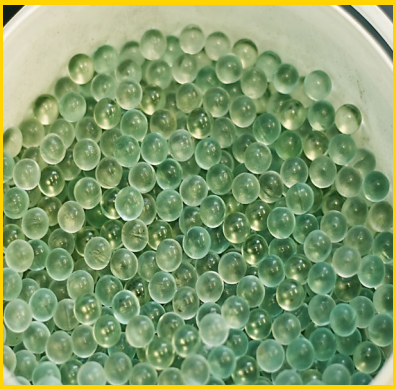
The School and its Staff



Undergraduate Studies

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Research

Professor Mark Hoffman

Welcome from the Head of School

The 2011/12 period has continued the strong growth which the School has demonstrated over the previous 3 years. The School continues to perform strongly by all measures with the primary constraints being the external financial situation within Australia and physical infrastructure.

The School recruited 3 new academic staff in 2011. Dr Jianqiang Zhang commenced as a Senior Lecturer and Drs Zongyan Zhou and Dr Danyang Wang commenced as Lecturers. The School has also been very successful in obtaining externally-funded Fellowships with Dr Jan Seidel coming from Lawrence Berkeley Laboratory on an ARC Future Fellowship, Dr Jiabao Yi received a QEII Fellowship and relocated from Singapore and Drs Kejun Dong, Julia Glaum and Kevin Laws all receiving ARC DECRA Fellowships. There were no departures from the School's teaching and research academic staff which grew by 25% over this period. A number of staff were promoted. Sean Li was promoted to Professor; Xuchuan Jiang to Associate Professor; Jianqiang Zhang, John Daniels and Kevin Laws to Senior Lecturer, and Baoyu Guo to Lecturer.

Alumnus and Chairman of Wesfarmers, Boral and Redkite, Dr Bob Every, was appointed an Officer of the Order of Australia in January 2012 for distinguished service to business. Dr Every was recognised for his many achievements, including being an advocate for corporate social responsibility as well as a contributor to charitable organisations and support of the University.

Staff and students also received a number of awards. Most notable was Professor Aibing Yu's election as a Fellow of the Australian Academy of Science; a rare award provided to only a small number of scientists each year. This is an exceptional achievement within the Australian scientific community recognising a career that has significantly advanced, and continues to advance, the world's scientific knowledge. Professor Veena Sahajwalla was appointed as a Commissioner to the Australian Government's Climate Commission earlier in the year. The role of the Commission is to provide reliable and independent information regarding the science of climate change, international actions and the economics of a carbon price. This appointment is an impressive recognition of Veena and her activities in the field. Veena has also won the prize for Innovation Excellence for taking the polymer injection technology in green steel to international markets from concept to commercialisation within a decade awarded at NSI's 2012 UNSW Innovation Awards. Veena was also awarded the Nokia Business Innovation Award for the 2011 Telstra NSW Business Women's Awards for her work in the development of technology for using waste plastics in electric arc furnace steelmaking.

School PhD researcher, Jake Cao, received the Young Scientist Award at the World Biomaterials Congress in Chengdu. This is the largest international conference in the field, held every 4 years and Jake's award is major one. His work entitled Exploring New Ca-Mg-Zn Bulk Metallic Glasses as Bioresorbable Metals was considered "outstanding among the applicants". Jake was also a winner in last year's School Postgraduate Poster Competition and appeared on the ABC Science Show 6 months ago, following his 'finding' by Robyn Williams at last year's Faculty of Science Research Competition.

An artist impression of the new School of Materials Science and Engineering Building.

Student numbers showed considerable growth with an increased intake in 2011 across all levels of students; undergraduates, postgraduate coursework and postgraduate research. The School now has a total student body of over 380 students. 2012 saw a slight drop in international student intake, though the impact has been considerably less than that across the sector as a whole. This was balanced by an increased enrolment of local undergraduate students. Particularly pleasing is the continual rise in quality of the School's undergraduate intake with the ATAR cut-off continuing to rise year by year. 2011 saw a significant intake in international students seeking to do our undergraduate program relative to previous years. A drop off has occurred in 2012, however, the diversity of the School's student intake remains good. The School is also developing articulation program arrangements with a number of key international universities providing a formal path for students to enter the School's programs in their third year.

The industry-supported scholarships provided to undergraduates students through both the industry partnership and Co-op programs provide a significant incentive for high-quality students to enter the School. In recent years, there has been a significant pipeline of graduating students into these industries reflecting the considerable benefits to all parties of these scholarships.

The School's research income rose dramatically in 2011. This has been driven most notably by an increased diversity of the School's income sources with big growths in contract research support both locally and, most notably, internationally. While the rise in the Australian dollar has caused challenges for the Australian manufacturing industry with which the School is closely linked, it has simultaneously led to an increase in the number of international companies investing in the School as a research partner, particularly from Asia and Europe, reflecting the increased globalisation of tertiary research and education.

The most significant change in the School, however, has been the confirmation of the University's commitment to construct a New Building for the School. This year's Annual Report includes a detailed outline of the project. The University has commissioned internationally leading architects and laboratory developers to build a building which provides intrinsic links between laboratory research and staff. The School will be the major tenant of this building, occupying 4-5 floors. This will provide a significant increase in the quality of the School's building infrastructure and also a near doubling of its floor space. The University's commitment is a reflection of the high performance of the School over many years and its high levels of engagement with industry, which UNSW sees as a central part of its mission.

There are, however, a number of developing challenges for the School. The federal funding agencies upon whom the School depends heavily for support of its research and staff salaries are under increasing pressure as the Federal Government seeks to balance the budget. The challenges of the Australian manufacturing industry also are limiting its ability to commit long term investment to research and scholarships. In the short term, space remains a considerable constraint upon the School's growth and the necessity to balance supporting research with OHS requirements is a continual challenge.

In summary, the School is in a very strong position moving forward. There are challenges on the horizon, however, it is in a

The University of New South Wales

The University of New South Wales is one of Australia's leading research and teaching universities. Established in 1949, it is ranked among the top 50 universities in the world, renowned for the quality of its graduates and its world class research.

UNSW is a founding member of the Group of Eight, a coalition of Australia's leading research-intensive universities, and of the prestigious international network Universitas 21. With more than 50,000 students from over 120 countries, it is one of Australia's most cosmopolitan universities.

School Vision

To be recognised nationally and Internationally as a leading academic centre for materials science research, education and industry collaboration.

School Purpose

To actively contribute to the growth & impact of the field of materials science through:

- Providing relevant, high quality undergraduate education programs
- Providing high quality research training programs
- Graduating & mentoring local & international research students
- Conducting high quality research across a range of fields
- Advising, collaborating & consulting with industry and governments
- Partnering effectively with academic colleagues at UNSW & across the world

School Organisation

Head of School & Professor
Mark Hoffman BE, PhD (USyd), MBT (UNSW), FIEAust

Deputy Head of School & Senior Lecturer
Owen Standard BE (Hons), PhD (UNSW)

Emeritus Professors
David J Young BSc (Hons), PhD (Melbourne)

Professors
Alan Crosky BSc (Hons), PhD (UNSW)
Michael Ferry BE (Hons) (UoW), PhD (UNSW), CPEng, FIEAust, CEng, FIMMM
Paul Munroe Director, Electron Microscope Unit BSc (Hons), PhD (Birmingham), Grad.Dip. H.Ed. (UNSW)
Oleg Ostrovski ARC Professorial Fellow DipIng (Met), PhD, DSc (Eng) (Moscow Steel & Alloys Institute)
Veena Sahajwalla – Associate Dean (Strategic Industry Relations) BTech (IIT Kanpur), MASc (UBC), PhD (Mich), MAIE, MIBF, MAus., IMM, FTSE
Charles C Sorrell BSc (Missouri), MSc (Penn.), PhD (UNSW)
Aibing Yu – ARC Federation Fellow & Scientia Professor BEng, MEng (NEU), PhD (UoW), DSc (UNSW), FTSE, FIChemE
Sean Li BEng (Hons) (Wuhan), MEng (Sth China), PhD (Auckland)
Runyu Yang BEng, MEng (ZJU), PhD (UNSW), MIT (Sydney)

Associate Professors
Sri Bandyopadhyay BTech (Hons) (IIT Kharagpur), MTech (IIT Kanpur), PhD (Monash), FIEAust.
Sammy Lap Ip Chan BSc (Lond), PhD (Cantab), ARSM, CEng, CSci, FIMMM
Nagarajan Valanoor – ARC Research Fellow BE (Pune), PhD (Maryland)

Senior Lecturers
John Daniels BSc (Monash), PhD (Monash)
Jianqiang Zhang BE (SEU), ME (ZJU), PhD (UNSW)

Lecturers
Guangqing Zhang BSc (Hons), ME (China University of Petroleum), PhD (UNSW)
Danyang Wang - BE (TJU), MPhil (PolyU), PhD (PolyU)
Zongyan Zhou BE (NEU), PhD (NEU)

ARC Future Fellows
Xuchuan Jiang BSc (Shandong University, China), PhD (UST China)
Baolin Wang
Jan Seidel

ARC Professorial Research Fellow
Yong Zhao BSc (Hons), PhD (UST China)

Postdoctoral Researchers, Research Associates and Research Fellows
Joseph Arsecularatne BSc (Hons) (University of Moratuwa, Sri Lanka), PhD (Manchester)
Cui Hua Cecily Cheng BSc (Hons) (HUST), PhD (UNSW)
Ke-jun Dong BSc, MSc (Hunan),PhD (UNSW)
Baoyu Guo BE (HEBUT), ME (TJU), PhD (USyd)
Sushil Gupta BSc, MSc (MD University, India), PhD (Newcastle)
Rita Khanna MSc (Hons) (Panjab University, India), PhD (Madras University, India)
Kevin J Laws BE (Hons), PhD (UNSW)
Yansong Shen BEng, MEng (NEU), PhD (UNSW)
Thiam Teck Tan BASc, PhD (NTU, Singapore)
Tania Vodenitcharova BE, PhD (UACEG – Sofia), Dip. App. Math (TU – Sofia)
Wangqiang (Martin) Xu BE (Hons) (Hebei UST China), ME (XUT), ME (Auckland), PhD (UNSW)
Ruiping Zou BEng (NEU), MEng (UoW), PhD (UNSW)
Jianqiang Zhang
Danyang Wang
Julia Glaum
Zhimin Ao
Kashinath Bogle
Kaiwei Chu
Kaveh Kabir
Pramod Koshy
Shibo Kuang
Auppatham Nakaruk
Dilip Nath
Nick Savvides
Baolin Wang
Magda Zaharia

Visiting Academics
Zonghan Xie
Masanori Iwase
Soodkhet Pojprapai
Patel Mahesh
Lori Bassman
Oscar Juan Borrero-Lopez
Stephen David Joseph
Dayantha Shreshta Perera
Lukas Van Zwieten
Wei Shen
Delphine Retraint
Myoung,Kyoung Jun
Masatoshi Ishii
Jennifer Sinclair Curtis
Nicholas Savvides
David John Young
Bessim Ben-Nissan
Haiping Sun
Lena Sundqvist Oqvist
Maria Lundgren

School Manager
Lucy Zhang BA (SISU) GCBusAdmin (UNSW)

Professional Officer
Jane Zhi Gao BE (Tsinghua Uni)

Research Engineer
N.M. Saha-Chaudhury BE (Mech), MIEAust, CPEng, MAIE
Bill Joe BE (UNSW) MEngSc (UNSW) MIE (Aust)
Phillip Boughton

Technical & Senior Technical Officers
Rahmat Kartono PhD (UNSW)
Anthony Zhang BSc (UNSW), MSci (UNSW)
Thwin Htoo BSc (Honours), MSc (Yangon), DICTP-CMP (ICTP, Italy)
Danny Kim BElecSci (Ho Chi Minh City University)
George Yang BE (UTS), PhD (UQ)
Soo Chong BASc (Materials Engineering)

Administrative Assistants
Courtenay Atwell BComm (UNSW)
Judy Lim BSocSc (UNSW)
Uttra Benton
Lana Strizhevsky BMusBEd (Moscow Cons)

Executive Assistant to Head of School
Christina Chung B Sc (UNSW)

Outreach & Student Recruitment Officer
Rosalind Haskew BEc/LLB(Hons) ANU

Director, Postgraduate Studies
Charles C Sorrell

Undergraduate Program Co-ordinators
BE: OwenStandard
BE/MBiomed: Owen Standard
BE(Mats)/BE (Chem): Owen Standard
BE/BCom: Michael Ferry
BSc (Nanotechnology): Sammy Chan
Co-op Program: Owen Standard


UNSW
School of
Materials Science
and Engineering
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School Snapshot

110
new students

$11 million
Research Grant Income

28
PhDs Awarded

227
publications produced

160
Undergraduate Students

24
International Visiting Academics

School Visiting Committee

Leo Selleck (Chairman)
Chief Executive, Steel Manufacturing, ONESTEEL

Fred Bradner
Division Director of Technology, WEIR MINERALS

Lyndon Edwards
Head, Institute of Materials Engineering, ANSTO

Robert Every
Chairman, BORAL and WESFARMERS

Cathy Foley
Chief, Materials Science and Engineering, CSIRO

Cathy Inglis
Group Technical, Research and Engineering Manager, BRICKWORKS

Roger Leigh
Senior Project Manager, COCHLEAR LTD

Chris Mouatt
National Research and Development Manager, BORAL BRICKS

Stephen Robertson
Executive General Manager, Industrial Products, Metals Distribution, CRANE GROUP LTD

Greg Smith
Director, SCIVENTURES INVESTMENTS PTY LTD

Paul Zulli
Manager, Iron and Steelmaking Research, BLUESCOPE STEEL RESEARCH

Merlin Crossley
Dean, Faculty of Science, UNSW

Mark Hoffman
Head of School, Materials Science & Engineering, UNSW

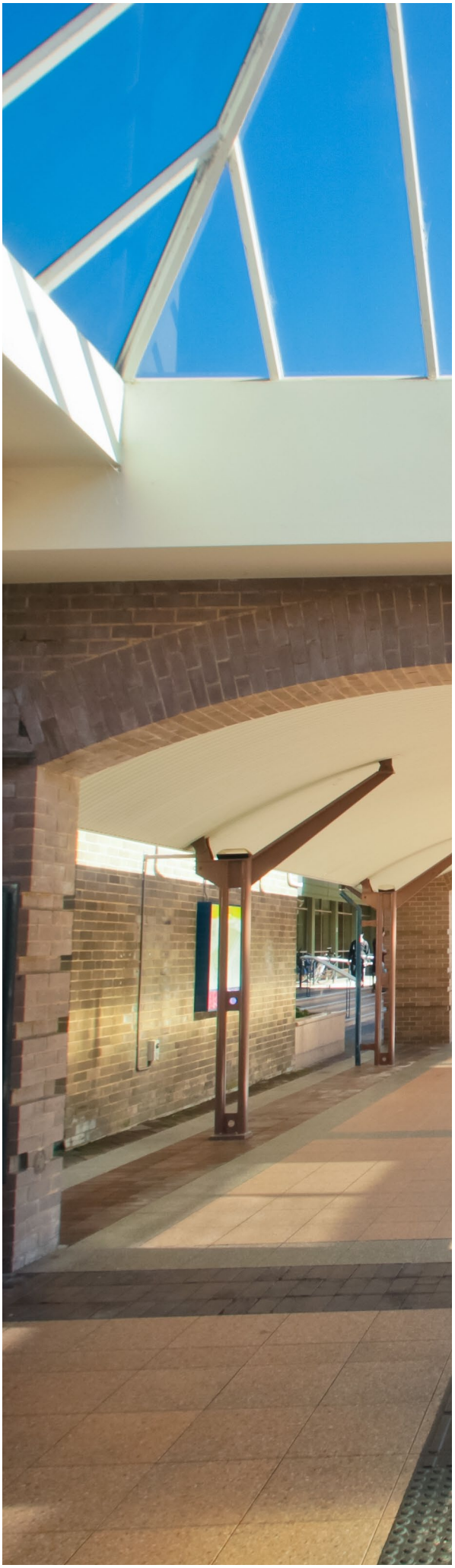
Shane Griffin
Director, Student Recruitment & Scholarships, UNSW

Adam Berkovich
Manager, Carbon Technology and R&D, RIO TINTO ALCAN

David Varcoe
General Manager Product R&D, BLUESCOPE STEEL

Michiel Freislich
Dircetor, Energy and Environment, Iron and Steel, HATCH

Lucy Zhang
School Manager, Materials Science and Engineering, UNSW



International

The School's engagement internationally within the research and teaching community is an important part of its mission. In a city where more than half the population has at least one parent born outside Australia, it should be no surprise that the participation of the School in its global community is becoming increasingly significant.

The School has for a long time been a home for international researchers, most particularly postdoctoral and research staff and the School has always had a strong international research student population. The last couple of years have seen a dramatic increase in the number of international research students in the School and it is this group that has driven the School's growth with local student numbers remaining essentially constant. Another significant change in the student mix in recent years has been the large increase in international students seeking to study its undergraduate and coursework Masters degrees. The BE (Materials) program now has over 30% of enrolments from overseas providing a diverse mix of backgrounds and this is also a reflection of the School's strong international reputation. Enrolments in the coursework Masters program have increased five-fold in the past 3 years through international interest.

Internationally-funded research has also grown significantly. The School currently has 7 active ARC Linkage Projects worth nearly $2 million dollars with international research partners. Furthermore, contract research from across Asia and Europe continues to grow. The strongest international research collaborations are within the steel industry, most notably with India, Korea, China and the US, through companies such as Baosteel, Tata Steel, POSCO and Haynes. The new energy sector has also lead to new collaborations with China and Europe, especially Germany.

Engagement

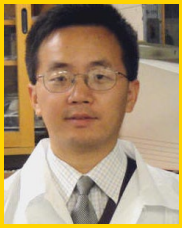
Former School members also hold leading positions internationally. Many of our research students are now academics in universities in countries including Thailand and Malaysia. Former research staff also hold senior academic appointments across the world, such as Associate Professor Jacob Jones at University of Florida, Robert Moon at Purdue University, Dr Xizhang An at Northeastern University (China), Dr Bo Wang at Lanzhou University (China), Dr Baohua Xu at the University of Leeds, and Dr Miryam Arredondo at Queens University Belfast.

The School's international engagement is driven first and foremost by its world leading reputation. The School is consistently ranked within the top 50 Materials schools in the world and within the top 10 in Asia, building on its position as one of the leading research schools within Australia (2010 QS rankings placed it as number 1 in metallurgy). Distinctively, the School has a very diverse and internationally engaged mix of staff. 16 of its 20 academic staff confidently speak a second language and this ability to engage is strongly reflected in international research relationships. Furthermore, many staff have at least one degree or significant working experience overseas and these linkages have continued in their time at UNSW. The School strongly values its international engagement and regularly supports staff on missions to increase both research and learning and teaching international relationships in a drive to continue to be a global player in materials science and engineering.

Visitors to the School

In 2011 we were privileged to welcome a number of distinguished international visitors.

Professor Samuel Mao
University of California, USA



Prof. Samuel Mao is Director of Clean Energy Engineering Laboratory at Lawrence Berkeley National Laboratory, and adjunct professor at University of California at Berkeley. His research is focused on the development of renewable energy technologies as well as the study of enabling materials and laser processing solutions. He obtained his Ph.D. degree from the University of California at Berkeley in 2000, and has published 90 peer-reviewed journal articles which has received over 8000 citations. He also contributed five book chapters and is an inventor of 14 U.S. and international patents. He has delivered more than 60 invited talks at various international conferences and academic institutions, and he co-founded three international conference series: the First International Symposium on Transparent Conducting Oxides, the First International Conference on Energy Nanotechnology, and the First International Workshop on Renewable Energy. He was a general chair for the Materials Research Society annual meeting in the spring of 2011, which attracted more than 5000 scientific presentations. He has served as a technology committee member, national laboratory observer, program review panellist, and grant evaluator for the U.S. Department of Energy as well as for the government of Canada, Japan, and China. He is the board member of three high tech companies, and has served as an advisor for private investment firms.

Professor Shin-Ya Kitamura
Tohoku University, Japan

Professor Shin-Ya Kitamura is an academic at the Institute of Multidisciplinary Research for Advanced Materials in Tohoku University (Japan). His research focuses on the production processes of base materials, such as iron- and steel-making processes, belong to an age of technical innovation toward an eco-friendly society.

To support this innovation, fundamental studies are being conducted in the laboratory.

1. Improvement in Reaction Efficiency by use of Multiphase Slag
2. Separation and Recovery of Rare Metals from By-product of Steelmaking Process
3. Process Design of Highly Efficient Reactors by Enlargement of Reaction Interface
4. Effect of Non-metallic Inclusions on Kinetics of Solidification, Phase Transformation, and Precipitation in Steel
5. Development of Technique for Measurement of Thermal Properties of Advanced Materials
6. Green Iron- and Steelmaking Technology

He is a member of The Iron and Steel Institute of Japan (ISIJ), The Japan Institute of Metals (JIM), The mining and Materials Processing Institute of Japan (MMIJ), Association for Iron & Steel Technology (AIST).

Professor Wei Duan
Deakin University, Australia

Professor Wei Duan graduated with a MBBS degree from Shanghai University of Chinese Medicine and obtained his Ph.D. in Biochemistry and Molecular Biology at University of Melbourne in 1991. fter working as an Assistant Professor in Faculty of Medicine at National University of Singapore, he joined Deakin University as an Associate Professor at the newly established Deakin Medical School, where he heads a cancer nanomedicine programme. He is now a full professor at Deakin Medical School.

Prof. Duan has published over 100 original research papers and review articles in journals such as Cancer Research, The FASEB Journal and Journal of Biological Chemistry. His work is supported by grants from Australian Government's National Health and Medical Research Council and Australia-India Strategic Research Fund. His main research interest is in the application of aptamer technology in targeted cancer drug delivery and molecular imaging.

Professor Dragan Damjanovic
Swiss Federal Institute of Technology, Switzerland

Professor at the Ceramics Laboratory, Institute of Materials of the Swiss Federal Institute of Technology in Lausanne (EPFL). Professor Damjanovic works in the field of piezoelectric, dielectric and ferroelectric properties of ceramics, single crystals, and thin films and their applications. He investigates experimentally physical processes taking place at different length and time scales and how they affect macroscopic behavior of materials.

He has co-authored over 180 publications and has lead or participated in numerous European and Swiss research projects and has been awarded the ISIF outstanding achievement award, Ferroelectrics Recognition Award of the IEEE UFFC Society. Professor Damjanovic is a Fellow of IEEE, and serves as a distinguished lecturer of the IEEE Ultrasonics, Ferroelectrics and Frequency Control Society in 2010/11.

Dr Eungyeul Park
Hyandai Steel Company, Korea

Dr Eungyeul Park currently works with Hyundai Steel Company (Korea). He is involved with the planning and construction of the new Integrated Steel Mill, the construction and commissioning of the Plate Mill, technology planning in the R & D Center, development and quality planning and global cooperation.Dr Park has also spent time as a Research Fellow in Max-Planck-Institute for Iron Research (Duesseldorf,Germany) and Pohang University of Science and Technology.

Professor Yusushi Sasaki
Graduate Institute of Ferrous Technology, Korea

Professor Yusushi Sasaki is a Professor at the Graduate Institute of Ferrous Technoloyg (GIFT). His current research is concerned with the 'Green processing of iron/steelmaking', namely, to develop iron/steelmaking processes and produce new steels that can meet the demand of CO_2, energy and resource issues. Other areas of interest include CO_2 chemistry, waste treatment and clean technology, the application of DEM and CFD to iron production process, simulation and modeling of metallurgical slags, geometallurgy and interfacial reaction kinetics.

Dr Jia Lin Yang
Prince of Wales Clinical School, Australia

Dr. Jia-Lin Yang is currently an Associate Professor and a team leader of the Sarcoma Research Group in the Adult Cancer Program of Lowy Cancer Research Centre and Prince of Wales Clinical School at the University of New South Wales. He is a current member of Scientific Advisory Committee of the Australian Sarcoma Study Group.

He graduated from the Norman Berthune Medical College in China in 1984 and started his medical practice career. In 1989 he became a rheumatology specialist and also obtained his PhD in the Peking Union Medical College. A competitive international grant from the Australian Arthritis Association supported him to Sydney to work as a research fellow at St Vincent's Hospital. One year later he was employed by Prince of Wales Clinical School and started his 18-year surgical oncology research. He obtained a Masters degree of Education from UNSW in 1997. He is the course convenor of Cancer Sciences of Faculty of Medicine.

Dr Jon Gosse, Dr Steve Christensen and A/Prof Dan Simpkins
Boeing Compnay, USA

Jon Gosse, PhD, P.E. is a Boeing Technical Fellow. He has 25 years experience with the Boeing Company and has expertise in the mechanics of composite materials, numerical methods and multi-scale modeling.

Steve Christensen is a Boeing Technical Fellow. He has 31 years experience with the Boeing Company and has expertise in physical polymer science, materials and processes and molecular modeling.

Dr. Simkins is an Associate Professor at the University of South Florida. He holds a Master's degree in physics and PhD in Structural Engineering. He spent 10 years at the Lawrence Livermore National Laboratory and private enterprise before joining the University.

Associate Professor Juan Nino
University of Florida, USA

Juan Claudio Nino, is an Associate Professor in the Materials Science and Engineering Department at University of Florida (UF) in Gainesville, FL. Associate Professor Nino has established the Nino Research Group (NRG) with a main focus on the investigation of fundamental relationships governing energy-related materials towards enhancing their efficiency, performance, and sustainability. NRG's research investigates ceramics, polymers, bio-inspired materials, and their composites. Current research concentrates on five main areas: (a) enhancement of electrolytes for intermediate temperature solid oxide fuel cells (SOFCs); (b) rational design of high temperature proton conducting membranes for hydrogen fuel cells; (c) determination of structure-property relationships in dielectric ceramics for capacitive (energy storage) applications; (d) optimization of inert matrix nuclear fuel systems for reducing nuclear waste; and (e) development of semiconducting ceramics for radiation detection devices. Dr. Nino has over 60 scientific publications and is Coordinating Editor of the Journal of Electroceramics and Associate Editor of the Journal of the American Ceramic Society. He is a recipient of the CAREER award by the US National Science Foundation, the J Bruce Wagner Jr Young Investigator Award from the Electrochemical Society, and in 2010 he was named the International Educator of the Year by the College of Engineering at UF.

Professor Em. Kunio Shinohara
Hokkaido University, Japan

Kunio Shinohara is a Professor Emeritus at Division of Materials Science and Engineering in Hokkaido University, Sapporo, Japan. Shinohara graduated in Chemical Process Engineering from Hokkaido University, completed Master Course in Powder Technology in Kings College, London, and took his Doctor of Engineering from Hokkaido University in 1973 on "Mechanism of flow of particulate solids". He was adopted as a research and teaching assistant at the same department and engaged in Analyses of powder characteristics and particle flow mechanisms and in their applications to unit operations of powder processes. Since he promoted to Professor via Associate in 1992 he developed operations of functional particles such as diamond lapping, particle coating for super-hard composite, bioceramics and cosmetics, control release particles for fertilizer and pharmaceuticals, formation of Lithium Ion Battery film in addition to CVD coating of nano-particles with moving bed and particle operation under microgravity. After his retirement in 2006, he visits SIMPAS, UNSW, every year for research collaboration.

Professor Markus Donath
Westfälische Wilhelms-Universität Münster, (Germany)

Professor Markus Donath is an academic at Westfälische Wilhelms-Universität Münster (Germany). During his time as a Visiting Professor (JSPS Invitation Program) at the Hiroshima Synchrotron Radiation Centre, Hiroshima, Japan, Professor Donath made a trip to UNSW to present a lecture on experiments with spin-polarized electrons to probe electron states at the surface offer magnets and nonmagnetic high –Z materials with broken inversion symmetry. He also discussed pin-dependent relaxation dynamics, where magnon emission provides a significant source of ultra-fast spin-flip processes.

Dr Daniel Holland
Cambridge University, England

Dr Daniel Holland graduated from the Department of Chemical Engineering at the University of Canterbury in 2000. After a brief spell in with Industrial Research Limited in Wellington, he travelled to England where he completed his PhD on protein chromatography under Prof. Anton Middelbergand Prof. Lynn Gladden at the University of Cambridge.
Since 2006 Dr Holland has been a Research Associate in the Magnetic Resonance Research Centre in Cambridge where he develops new magnetic resonance techniques to study multiphase flows, and other interesting problems.

Professor Qing-hua Qin
Tianhin Univeristy, China

Qing-Hua Qin was born in Yongfu County, Guangxi province of China. He joined the Department of Mechanics as an associate lecturer at Huazhong University of Science and Technology (HUST) in China in 1984, and was promoted to lecturer of mechanics in 1987 during his PhD candidature period. After spending ten years lecturing at HUST, he was awarded the DAAD/K.C. Wong research fellowship in 1994,which enabled him to work at the University of Stuttgart in Germany for nine months. In 1995 he left HUST to take up a postdoctoral research fellowship at Tsinghua University, China, where he worked until 1997. He was awarded a Queen Elizabeth II fellowship in 1997 and a Professorial fellowship in 2002 at University of Sydney and stayed there till December 2003, both by the Australian Research Council, and is currently working as a professor, associate dean of the college, and group leader of materials and manufacturing group in the Research School (RSE) of Engineering at the Australian National University (ANU), Australia. He was appointed a guest professor at HUST in 2000. He was also awarded a Cheung Kong Professorship at Tianjin University in 2001 from the Ministry of Education of China. He has published more than 200 journal papers and seven monographs in the field of applied mechanics, and was a recipient of the J.G. Russell Award from the Australian Academy of Science.

Dr Jan Seidel
Lawrence Berkeley National Laboratory, USA

Dr Jan Seidel is a Postdoctoral Research Associate in the Materials Sciences Division at Lawrence Berkeley National Laboratory where he is researching structure and opto-transport of complex oxides using advanced spectroscopy techniques. He obtained his Diploma in Physics in 2000 from the University of Technology, Dresden, Germany with a thesis entitled: "Optical near-field characterization and manipulation of metal nanoparticles." From 2001-2006, Dr Seidel was a Research Associate at the Institute of Applied Photophysicsat the University of Technology, Dresden, Germany, where his main area of research was in nanooptics, spectroscopy and plasmonicsdesign and implementation of scanning probe hardware. From 2006-2007, he worked in the Concept Lab in the Department of Physics at the University of California, investigating nanoscaleelectric transport in multiferroicdomain walls.

Dr Mingde Xia
Johnson & Johnson, USA

Dr. Mingde Xia is currently a Senior Director in the Corporate Office of Science and Technology at Johnson & Johnson and a vice Chair of Asian Society for Innovation & Achievement (A.S.I.A.) across USA and Canada. His responsibility includes science & technology collaboration in Asia for J & J worldwide pharmaceutical, medical device and consumer business. He earned B.S. in 1984 and M.S. in 1989 and served as a faculty member at China Pharmaceutical University before went to Michigan Tech for his PhD. He completed his postdoctoral research at Yale University in chemistry and then joined Johnson & Johnson. He has been working as a project leader and then project champion since 1999 in the areas of inflammatory diseases, diabetes & obesity complications, analgesics and so on, aiming to discover new drug candidates.

Professor Stefan Luding
University of Twente, The Netherlands

Professor Stefan Luding is one of the world-leaders in the physics of granular materials.
He is a Professor and Director of the Multiscale Mechanics group in the University of Twente (The Netherlands) . The group deals with fluids and solids, particles and their contacts, granular materials and powders, micro-fluid systems, self-healing materials and a variety of multi-scale theory and modelling approaches. Professor Luding has 74 reviewed journal articles and 49 proceedings publications, he is the Managing Editor of 'Granular Matter' and the President of the (AEMMG) Association pour L'Etude de la Micromecanique des Milieux Granulaires.

Dr Jacob Bowen
University of New South Wales, Australia

Jacob Bowen received his Bachelor of Metallurgical Engineering from the UNSW School of Materials Science and Engineering (Physical Metallurgy) in 1996 as an industrial Co-op scholar. In 2001, he received his PhD from the University of Manchester Institute of Science and Technology at the Manchester Materials Science Centre in the field of ultra-fine grained metals and high resolution electron backscatter diffraction. After completing his PhD, he joined the Risø National Laboratory Materials Department in Denmark as a post-doc and scientist. In 2006, he moved to the Fuel Cells and Solid State Chemistry Division as senior scientist, where he has worked primarily on the characterisation of SOFC and related devices. He is currently a short term Visiting Fellow at the School of Materials Science and Engineering and the Electron Microscope Unit.

Dr Christopher Ling
University of Sydney, Australia

Associater Professor Ling holds an academic position in the School of Chemistry at the University of Sydney and is also affiliated with the Bragg Institute at the Australian Institute of Nuclear Science and Technology (ANSTO). His research centers on inorganic s olid-state chemistry that makes particular use of neutron and synchrotron X-ray scattering methods to characterise the structures and dynamics of new materials. He is the Chair of the Materials Division of the Royal Australian Chemical Institute (RACI) and the NSW Synchrotron Consortium (AUSyn14), a Board Member in the Asia-Oceania Neutron Scattering Association (AONSA) as well as the President of the Australian Neutron Beam Users' Group (ANBUG).

Dr Alexei Gruverman
University of Nebraska-Lincoln, USA

Dr Alexei Gruverman is an Associate Professor at the Department of Physics and Astronomy, University of Nebraska-Lincoln. He received his PhD degree in Solid State Physics from the Ural State University in Ekaterinburg, Russia. His research interests are in the field of scanning probe microscopy of functional materials, nanoscale phenomena in ferroelectrics, non-volatile information storage technologies and electricomechanical phenomena in biological systems.Prior to joining UNL he held research professorship position at North Carolina State University and research scientist positions at Sony Corporation, Yokohama, Japan, and Joint Research Centre for Atom Technology in Tsukuba, Japan. While working in Japan he has pioneered the SPM-based method for non-destructive high-resolution imaging of ferroelectric domains in thin films and memory devices – an approach now known as Piezoresponse Force Microscopy (PFM). He has co-authored over 100 papers, a number of book chapters and review articles and has edited three books and several special journal issues on ferroelectricity. He serves as an associate editor for the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control and is a recipient of the 2004 Ikeda Foundation Award and ISIF 2010 Outstanding Achievement Award.

Associate Professor Jacob Jones
University of Florida, USA

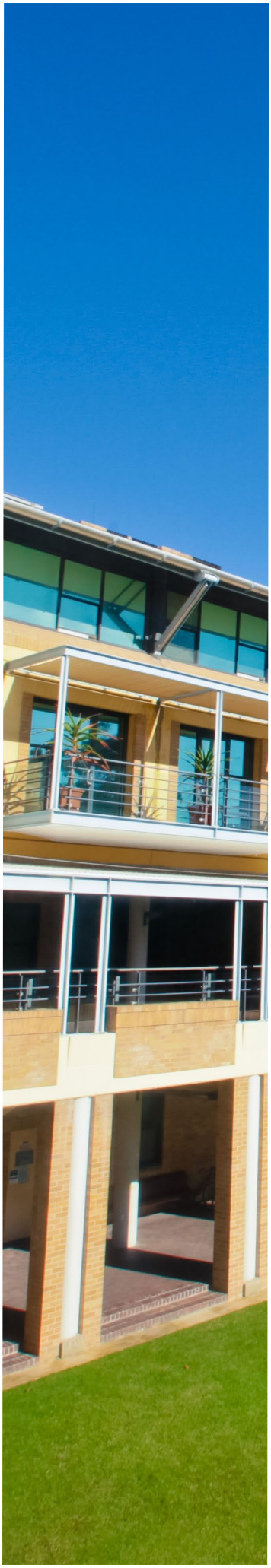
Jacob Jones is an Assistant Professor in the Department of Materials Science and Engineering at the University of Florida (UF). Jones completed his PhD at Purdue University in Materials Engineering in 2004, after which he undertook postdoctoral appointments at the University of New South Wales in Sydney,Australia and Iowa State University, sponsored under the NSF International Research Fellowship program. He joined UF as Assistant Professor in 2006, where his primary research interests include ferroelectric and piezoelectric ceramics, mechanical behavior of materials, and crystallography. Since 2004, he has published over 60 papers on these topics. Jones' research is supported by the National Science Foundation, the Army Research Office, Sandia National Laboratories, Oak Ridge National Laboratory, and other agencies. He has received the NSF CAREER award (2007), a Presidential Early Career Award for Scientists and Engineers (2009) awarded at a White House ceremony in January 2010, a National Nuclear Security Administration (NNSA) 2009 Defense Program Award of Excellence, the 2010 Edward C. Henry "Best Paper" award from the Electronics Division of the American Ceramic Society, and a 2010 Provost's Excellence Award for Assistant Professors at the University of Florida. Jones' research group currently consists of three postdoctoral research associates, seven PhD students, and numerous undergraduate research students.

A/Prof Jaques Guillaume Noudem
CRISMAT Laboratory, France

Jacques Noudem is a Materials Scientist at the CRISMAT Laboratory in France. He completed his PhD in Materials Science at Universite Joseph Fourier (Grenoble, France) in 1995 and was a researcher for the Schneider Company in 1996. He then went on to complete his postdoctoral training at RWTH Aachen University, Germany.His research interests include high-temperature superconductivity and thermoelectricity; processing of bulk superconductors and thermoelectric oxide metals; magnetic and electrical properties of bulk superconductors/ thermoelectrics; and engineering applications of high-temperature superconductors and thermoelectrics. Noudem has co-authored approximately 100 publications and has 1 patent and is the Director of 8 theses and supervisor of 3 Postdoctoral positions.

Prof. Dr. Jürgen Rödel
Technische Universität Darmstadt, Germany

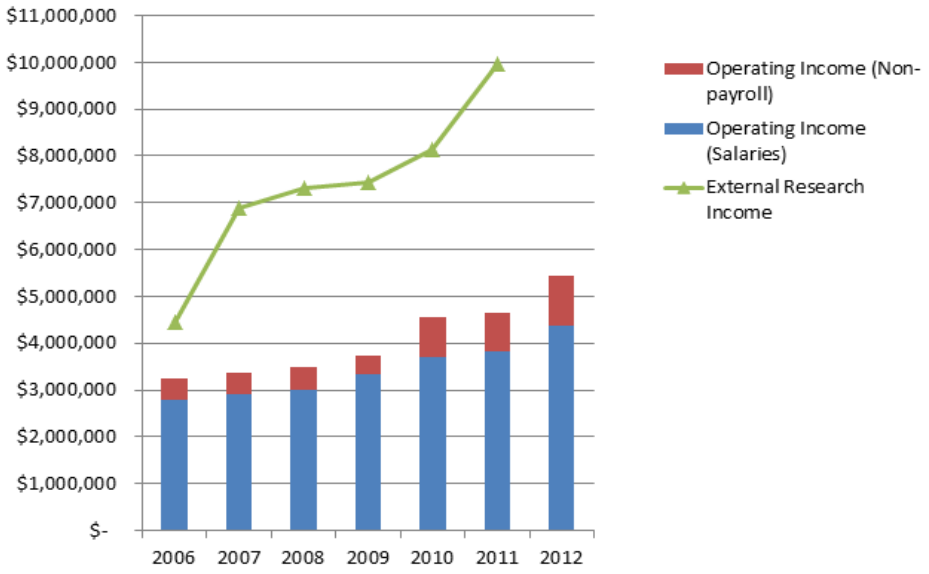
Rödel, a Fellow of the American Ceramic Society, works at the Institute of Non-metallic Inorganic Materials, Technical University of Darmstadt, where he focuses on high-performance ceramics such as ferroelectrics and lead-free piezoelectric ceramics. His discoveries have already made their way into mobile phones and controls for internal combustion engines.
Rödel is also researching novel gradient materials and has made new ceramic-metal gradient materials that he hopes will find applications in energy and medicine. Rödel obtained his doctorate from the University of California Berkeley, after which he worked as a postdoctoral researcher at Lehigh University in Bethlehem, Pennsylvania and at the National Institute of Standards and Technology, before returning to Germany.



Financial Report

INCOME

The School receives its income from three primary sources: ***Operating income*** is allocations from the University, via the Faculty, to fund the day to day running of the School. Income as it is earned by the University is linked to a series of drivers around the level of undergraduate teaching load and research training, grants and outputs. It is then allocated based upon undergraduate and postgraduate teaching load. ***Research*** income is from research grants obtained from bodies outside the university and ***Strategic allocations*** made by the University to the School for specific purposes. The graph below shows trends in the School's operating and research income.



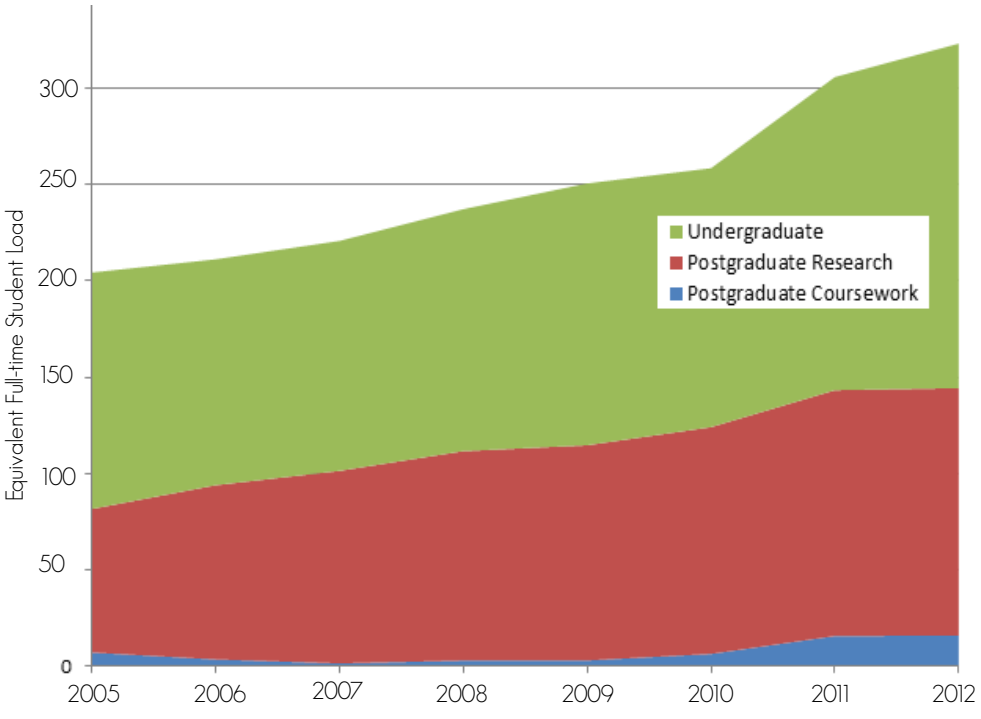
Operating Income

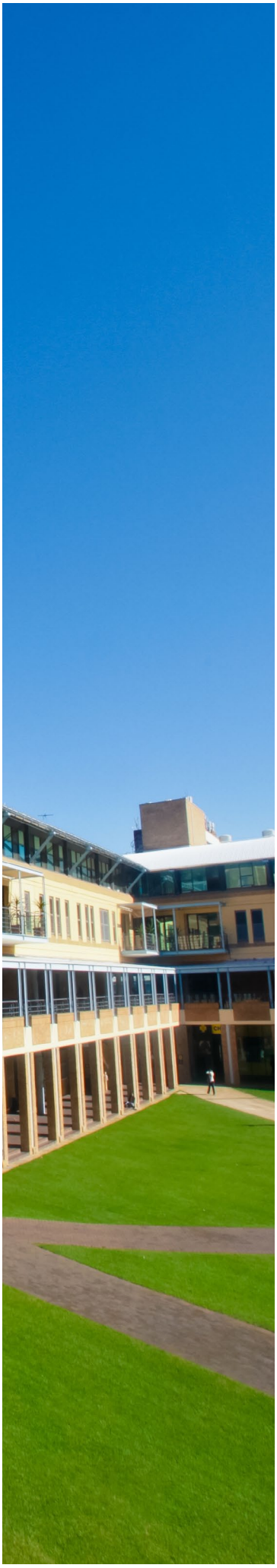
Operating income is primarily used for salaries for teaching and research academics and technical and professional staff. Even though a number of the School's academic staff hold externally-funded research fellowships there is invariably a shortfall in these fellowships which the School pays from its operating budget allocation, following a specific, though capped, allocation from the University for this purpose. It is also used to pay for casual teaching, administrative and laboratory staff. Other major expenditure items are support of teaching laboratories, administration, marketing and undergraduate recruitment scholarships, allocations to staff based upon research supervision and publications.

The table below shows the breakdown of School operating income in 2011. Total operating income was $4.66m. This represented a modest on the previous year due. A larger increase was received in 2012 due to strongly growing undergraduate student numbers.

INCOME		
University:		
Teaching	$6,483,141	
Research	$4,045,256	
Other	$62,9162	**$11,157,559**
Allocation to School:		
Teaching (Undergraduate teaching)	$2,638,380	
Research (Postgraduate training)	$1,722,121	
Fellowship salary shortfalls	$300,724	
Capital expenses	$173,914	**$4,661,225**
Carry forward from 2010	$200,000	**$4,861,225**
EXPENDITURE		
Salaries	$3,931,618	
Non-salary	$736,734	
Capital expenses	$44,654	**$4,713,006**
Variance		$148,219

The primary driver for operating income at the School level is undergraduate and postgraduate teaching load. The graph below shows the strong growth which the School has enjoyed in these areas in recent years which is currently funding expansion of the School's staff. Over 2009-2012, the School's EFTSL has grown 29% p.a.





Strategic UNSW Funding

The University provides central funding for a range of strategic research purposes including infrastructure, support of national initiatives and projects for early career researchers. In 2011, these included:

Project Name	Project Manager	Amount
50:50 APF	Ostrovski, Oleg	$100,000
Federation Fellowship support	Yu, Aibing	$519,412
Future Fellowship support	Sahajwalla, Veena	$110,00
CRC Advanced Manufacturing	Ferry, Michael	$20,000
CoE Functional Nanomaterials	Yu, Aibing	$39,000
CoE Design in Light Metals	Ferry, Michael	$125,000
AINSE Postdoctoral Fellow	Daniels, John	$31,596
ARC LIEF Grant Contribution	Yu,Ai Bing	$30,000
ARC LIEF Grant Contribution	Valanoor,Nagarajan	$382,000
ARC LIEF Grant Contribution	Zhang,Yuebing	$42,000
ARC LIEF Grant Contribution	Li, Sean	$600,000
ARC LIEF Grant Contribution	Zhang, Tianshu	$30,000
ARC LIEF Grant Contribution	Zhang, Tianshu	$250,000
ARC LIEF Grant Contribution	Bandyopadhyay, Sri	$22,000
ARC LIEF Grant Contribution	Chan, Sammy	$18,750
Early Career Researcher Grant	Zhimin Ao	$5,000
Early Career Researcher Grant	Kashinath Bogle	$2,566
Early Career Researcher Grant	John Daniels	$20,000
MREII Grant	Li,Sean	$120,000
MREII Grant	Daniels, John	$200,000
MREII Grant	Valanoor, Nagarajan	$112,400
VC's Postdoctoral Fellowship	Tian, Zean	$10,000
VC's Postdoctoral Fellowship	Ao, Zhimin	$8,000
VC's Postdoctoral Fellowship	Wang, Danyang	$8,000
	TOTAL	$2,695,834

The Faculty also received a number of strategic research allocations from the Faculty. In 2011, these were:

Project Name	Project Manager	Amount
ARC CoE Light Metals	Ferry, Michael	$25,000
CRC Composite Structures	Crosky, Al	$20,000
	TOTAL	$84,000

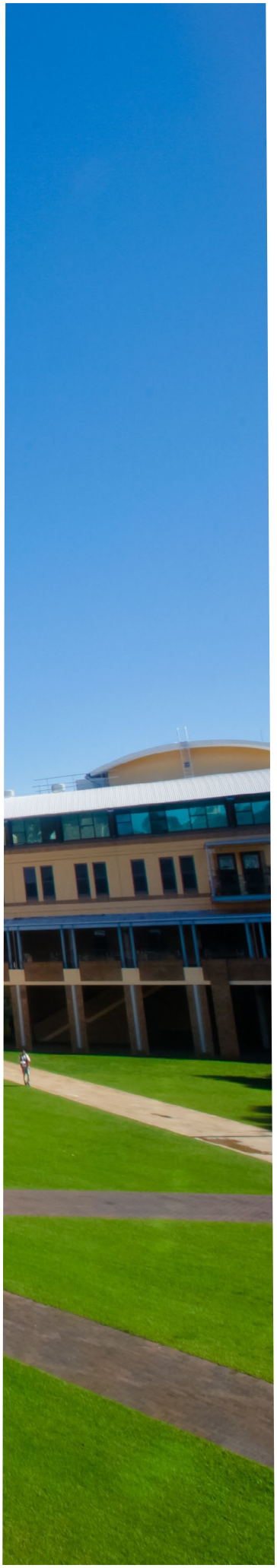
External Research Income

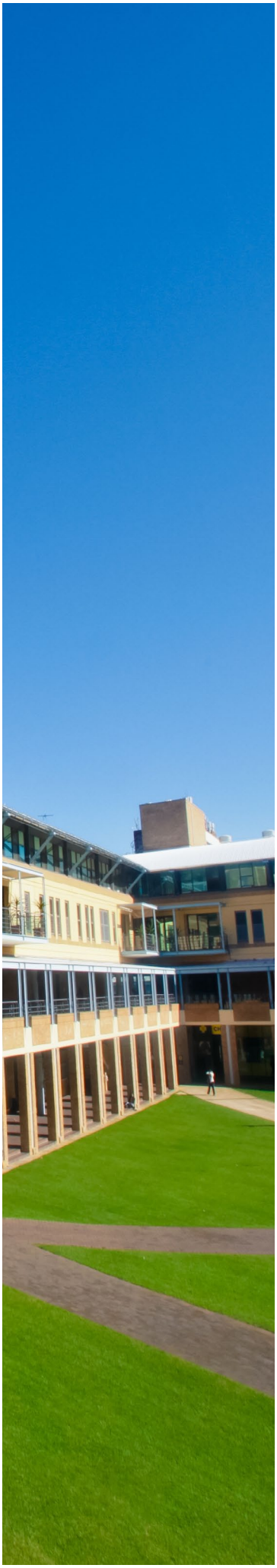
The School's external research income comprises the largest fraction of the overall income of the School. It is the funding provided by external bodies to the School's staff to undertake specific research projects. The School is a very high performing research unit within the University. Figure 1 above shows trends in external research income. Despite the School's growth in teaching-load driven operating income, research income continues to grow at a greater rate .Research income increased by 22% from 2010 to 2011. This was greater than recent years and reflects, in part, the growth in industry supported research.

EXPENDITURE

The main component of School expenditure is staff salaries which comprised 80% of total non-capital operating expenditure. This is consistent with a gradual downward trend over the last 4 years. Despite the strong rise in salary costs, School income has grown at a faster rate, providing greater flexibility in strategic directions. The table below shows the School's main expenditure items in 2011.

Item	Amount [$]
Faculty Research Grants	48,434
Student Research Allocations	105,500
Undergraduate scholarships	41,500
Computer technical support	40,000
Publications allocation	40,000
LIEF Contributions	43,550
Teaching laboratories	35,624
Safety	11,327
School Office	24,880
Labs/Workshops	35,000
Staff Start Up	33,000
Marketing	25,143
Repair, Maintenance & building utilities	6,882





Faculty Research Grants are funds for small research projects which are allocated from the School's operating budget. The School preferences junior staff who have not had the opportunity to build up significant external research funding when allocating these grants. In 2011, the recipients were:

Researcher	Project Title	Grant
Danyang Wang	Novel perovskite oxide thin films for ferroresistive random access memory application	$16,000
Dewei Chu	Development of advanced metal oxide thin films for applications of non-volatile memory devices	$11,000
Dilip Nath	Development of novel synthetic route for valuable carbon nanotube/fullerene using sustainable solid wastes	$4,000
Jiabao Yi	The study of magnetic uniformity in advanced magnetic semiconductors	$11,000
Jianqiang Zhang	High temperature performance of nanocrystalline Fe-Cr and Fe-Al alloys in CO2-H2O gas mixtures	$16,000
Kaiwei Chu	Illustrating the underlying mechanisms of the effect of coal in dense medium cyclones	$6,000
Kejun Dong	Structure analysis of the packing of multi-sized spherical particles	$11,000
Kevin Laws	Electromagnetic structural stabilisation of amorphous alloys	$11,000
Magdalena Zaharia	Recycling carbon blends containing coke breeze and waste plastics/agricultural by-products in iron and steel-making – wettability and interfacial phenomena investigations	$2,195
Mohammad Hussein Naseef Al Assadi	Superior thermoelectric performance in sodium cobulate (NaxCoCO2) via spin manipulation for waste heat recovery	$11,000
Shibo Kuang	Micromechanic modelling and analysis of dense-phase pneumatic transport of powders	$6,000
Tania Vodenitcharova	Scratch resistance of large-grained polycrystalline silicon with application to photovoltaic devices	$6,000
Wanqiang (Martin) Xu	The development of nanostructured ultra-high strength, low density bulk Mg-Li alloys	$4,000
Xuchuan Jiang	Deposition of thermochromic vanadium oxide nanofilms for smart glass coatings	$11,000
Zhimin Ao	Synthesis, characterisation and applications of three-dimensional grapheme materials for high capacity hydrogen storage	$11,000
Zongyan Zhou	Model studies of the heat transfer of ellipsoidal particles in fluid-bed reactors	$16,000

Overall the School is in a very strong financial position. Its operating income has grown from a large deficit situation in 2007 and 2008 to a strong position which has enabled a growth in academic staff. This has occurred primarily due to the growth in undergraduate and postgraduate research students.

OHS Report

The School of Materials Science and Engineering is committed to providing a safe work environment for all staff, students, and visitors in compliance with the NSW Occupational Health and Safety Act 2000 and the NSW Occupational Health and Safety Regulation 2001. This is achieved by the School's implementation and maintenance of the UNSW OHS Management Plan by the School OHS Committee in consultation with the OHS & Workers Compensation section of UNSW Human Resources and the Level 1 (University) and Level 2 (Faculty) OHS Management Committees.

In 2011, the School OHS Committee consisted of Owen Standard (chairperson and academic representative), Anthony Zhang (School Safety Officer), Rahmat Kartano (administrative and technical staff representative), Mark Hoffman (management representative), Ruiping Zou (research-only staff representative), and Samantha Clinch (postgraduate student representative). Anthony Zhang replaced Soo Woon Chong (who was on maternity leave in 2011) in the position of School Safety Officer. OHS activities in the School during 2011 included:

Development and Review of OHS Processes, Documentation, and Initiatives

- Overall risk assessments for laboratories and undergraduate teaching classes were reviewed.
- Introduced numerous OHS procedural improvements including: OHS pre/post purchase checklist for chemicals and equipment; chemical labelling system for all chemicals; experiment in progress signage.
- Introduction of the University "Harm to Zero" online portal for staff and students to report and manage OHS hazards and incidents.
- Introduction of a quarterly newsletter to the School highlighting recently occurred hazards and incidents.
- Fortnightly meetings of the School's technical staff include laboratory OHS as a standing item on the agenda for these meetings.

Training

- All new research staff, new postgraduate students, and Honours students completed the mandatory School OHS information session.
- All new research staff, new postgraduate students, and Honours students completed the "Safety Awareness in Laboratories" training course run by the University.
- All supervisors (academics and post-doctoral staff) completed UNSW OHS supervisor training.
- Two staff members completed forklift training course and have licenses to operate the Faculty forklift.
- Comprehensive HF training was introduced to the School for staff and students.
- Training course on gas handling, gas detection, and regulator usage was held for selected users.
- Three staff completed a formal Level 2 laser training course.
- Two evacuation drills were run for the School (in March and December)

Scheduled Workplace Inspections

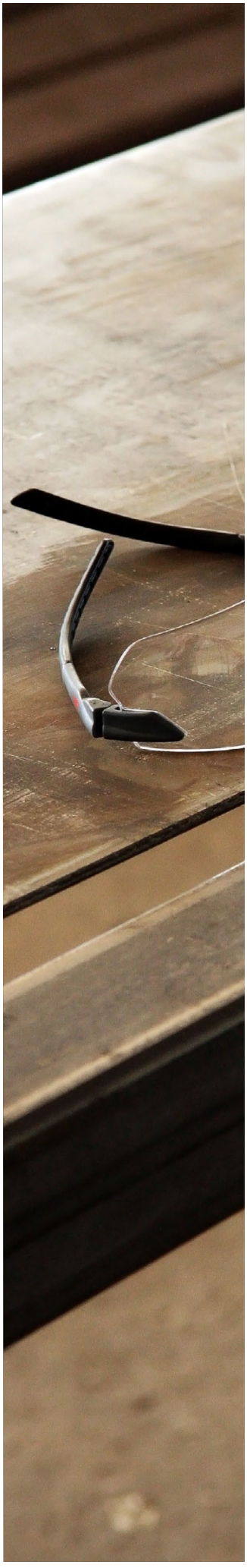
- Laboratory safety audits were conducted bimonthly.
- Conducted UNSW OHS Self Audit appraisal.

Improvements in the School's Infrastructure

- Continued improvements to the renovated School laboratories in the Red Centre Basement were made in 2011. Major OHS items included installation of rescue breathing apparatus and upgrading of the air extraction system.
- The renovation of laboratories at the rear of the D7 Process Building (ground floor process metallurgy laboratory and first floor sustainable materials laboratory) was completed and the laboratories were commissioned. New OHS documentation, training etc. were completed for all users of these laboratories.

All staff and students in the School are thanked for their ongoing cooperation and compliance with OHS requirements and procedures.

Dr Owen Standard
OHS Chairperson



Marketing and Outreach Report

Our major marketing event is UNSW Open Day, held on Saturday 3 September. We were blessed with glorious spring weather, and thousands of prospective students and their families attended. Our School marquee was once again in pride of place on the main walkway, with our orange lady in her Speedo LZR racing swimsuit and a Mitsubishi "Miev" electric car drawing in the crowds. We entertained all with a superconductor train running on liquid nitrogen, shape memory alloy springs, a Charpy testing machine, hydrogen fuel cell cars and an array of biomaterials and bulk metallic glasses. Our showbags were packed with lollies designed to demonstrate some fundamental properties of materials. Over 500 prospective students registered their interest in our undergraduate programs via the on-line facilities provided. As always, the success of this event relies on the enthusiasm and energy of our current students and staff, all of whom are terrific ambassadors for our School.

In October, our School celebrated its 60th anniversary with a dinner for over 150 of our alumni and friends at the Star Room, Darling Harbour. More details of this event can be found on page 27.

In December, we held interviews for our Industry Partner scholarships, and interviewed 18 high quality HSC leavers for the 5 scholarships to be offered for 2012.

Our Christmas Party for 2011 was a Hawaiian-themed extravaganza organised by Courtenay Atwell and Samantha Clinch. Hundreds of revellers enjoyed a superb selection of delectable food, and a fine time was had by all.

In 2011 we were pleased to welcome 70 first year students to our undergraduate programs. This was the highest number of first year enrolments ever achieved by our School. During Orientation Week, our new students were welcomed with a tour of the School, followed by lunch with their newly trained peer mentors (2nd – 5th year students). They were then officially welcomed by Head of School, Prof Mark Hoffman, and introduced to the School's teaching, technical and administrative staff, and to their allocated academic advisors.

In March our new students and their peer mentors and other members of staff enjoyed an afternoon of barefoot bowing and a BBQ at Kensington Bowling Club. MATSOC, the Materials Science and Engineering Students' Society, held an orientation camp for first year students in conjunction with the School of Chemical Engineering at the end of March.

The second semester social event for our first year students was a pizza and trivia night at GPK Restaurant, Kensington. The students not only enjoyed good food and some brain teasers, but also a song in their honour from our own Singing Professor, Sri Bandyopadhyay.

Our School participated in a variety of marketing initiatives organised by the Faculty of Science and the University throughout the year. January 5 was Info Day, when prospective students have an opportunity to speak with academic advisors and current students before making a final choice about the program they wish to study. On 24 May, the Faculty of Science hosted a Science Parent/Student Information Night. Our School is represented by members of academic staff and current students, who were able to promote our programs and answer queries from Year 11 and 12 high school students and their parents.

On 9 June, a Science Info Day was held for our network high schools. Our research support engineer (and former student), Dr Philip Boughton, gave a presentation entitled "Innovative and Sustainable Design Starts With Materials" to about 40 high school students. The session included several "hands-on" activities, and was very well received by the participants.

Thanks to everyone from our School community who contributed their time, energy and enthusiasm to promoting our School during 2011. Continued high enrolment numbers reflect the success of our marketing initiatives, and are a pleasing indication of the future health of materials science and engineering at UNSW.

Rosalind Haskew
Marketing and Outreach Coordinator


UNSW
Dr Owen Standard

Alumni Dinner

On 21 October, a gala dinner was held for alumni and friends to celebrate the 60th anniversary of the founding of our School. Over 150 guests enjoyed the wonderful food and views from the Star Room, atop the Imax Theatre in Darling Harbour. Alumni from the 1950's to the present day were able to catch up with friends and colleagues, and meet our current students and School staff, as well as representatives from our valued industry partners. A group of 6 graduates from the 1970's together with their partners made a special trip from Perth to attend the dinner.

We were honoured to have Sir Rupert and Lady Myers join the celebrations. Sir Rupert was the Foundation Professor and first Head of the School of Metallurgy, as our School was then known.

The guests were addressed by Prof Merlin Crossley, Dean of the Faculty of Science at UNSW, Alan Jostsons (1960's graduate and former director of the Materials Division at ANSTO.), and Brendan Ratter (2008 graduate and University Medallist). The keynote address was given by the Vice Chancellor of UNSW, Prof Fred Hilmer, who spoke warmly of the high regard in which the School and its graduates are held, and the splendid successes of the School in research and collaboration with industry.

New Building Report

In 2008, the University made a decision to explore the development for a new building for the School of Materials Science and Engineering. At that time, the Federal Government was seeking to stimulate the economy through the Building the Education Revolution program and a bid was made for funding. The bid was unsuccessful as, by that stage, funding was being focussed towards regional universities.
The University then decided to build-in a financial provision for the building into its forward planning. The project was scoped and the decision was made to construct a Physical Sciences Precinct including a building in which the School of Materials Science and Engineering would be the primary tenant. Provision would be made for unallocated 'shell space' for expansion within the precinct which also includes Chemical Engineering, Chemistry and the renowned Mark Wainwright Analytical Centre. In November 2011, the University Council approved the project and provided an allocation of $13 million towards developing a plan and preliminary works. An international team of architects, led by Grimshaw Partners, won a subsequent design competition for their concept of the building.

The building will have a unique design and will support the School's key focus by including a significant proportion of high quality research laboratories. These laboratories will be highly flexible and able to adapt to the changing research needs of the School, addressing a major flexibility constraint due to ever changing research initiatives and technologies.

The building has been designed and an image appears below. It comprises 8 floors above ground, making it one of the tallest buildings on campus. It will have a floor area of just under 22,000 m^2 and when completed is projected to cost $146.5 million. Construction will commence in April 2013 and is scheduled to be completed by the end of 2014 for a move-in in early 2015.

Figure 1. Northern Perspective of the Physical Sciences Building

Figure 2 below shows a cross section of the building's design with highly-serviced laboratories through the spine and offices and open-plan working space around the perimeter. Basement space is particularly important for high-end scientific instruments to avoid electromagnetic,inference and mechanical vibrations.

The total floor area which is currently allocated to the School of Materials is 11,000 m^2 with 3,700 m^2 of usable floor area for laboratories showing the high-intensity laboratory use for which the building has been designed. Significant detail has already gone into laboratory design with 2 planning meetings held in June and August 2012 with HDR, a US based and world-renowned laboratory design company.

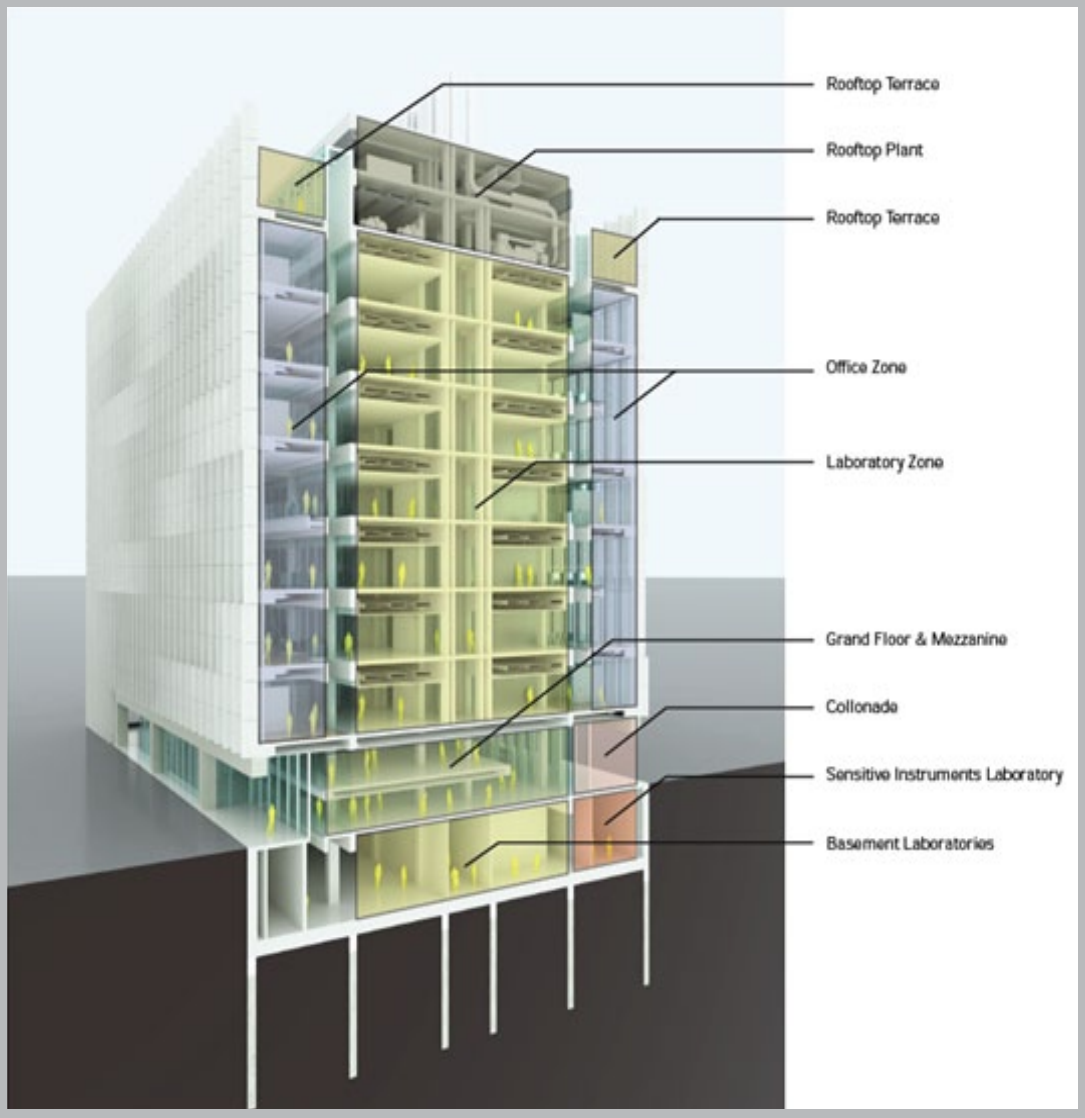


Figure 2. Cross-section of the Physical Science's Building design.

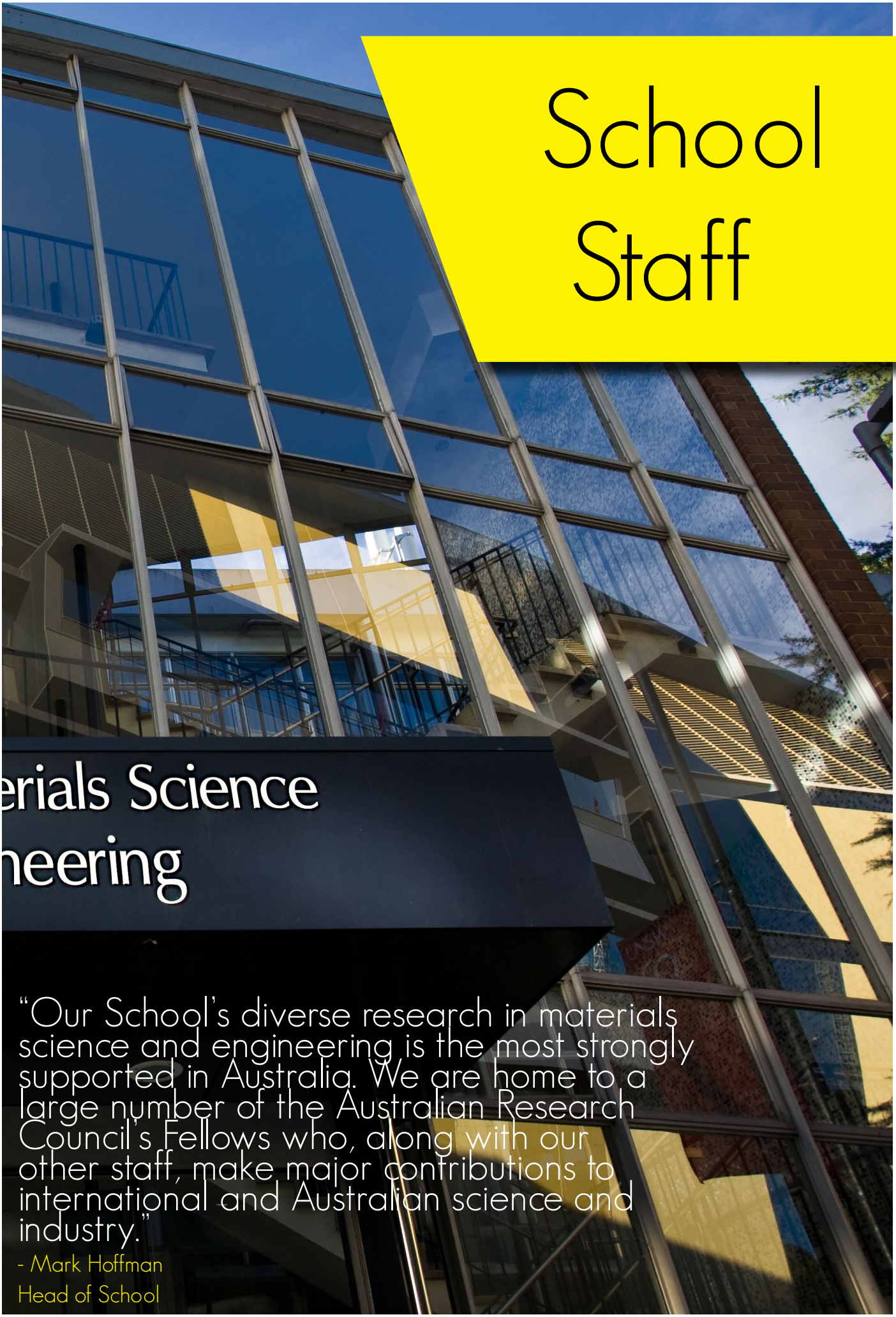
While the University has budgeted for the majority of the cost of the building to come from its own reserves as a part of its capital planning program, some of the cost of the building has been allocated from philanthropic and other external funding sources. The School is hoping to develop strategic relationships with external partners to encourage such contributions and integrate their ideas into the design of the building. Commitments have already been received from two major Australian companies.

The new building will provide exceptional opportunities over the next 50 years for the School to grow and to be one of the leaders in this field in the country. It is expected to significantly increase the School's capacity to both educate and serve its stakeholders, most notably students and local and international industry.

Mark Hoffman


School of
and

School Staff



"Our School's diverse research in materials science and engineering is the most strongly supported in Australia. We are home to a large number of the Australian Research Council's Fellows who, along with our other staff, make major contributions to international and Australian science and industry."

- Mark Hoffman
Head of School

Associate Professor

Sri Bandyopadhyay

Associate Professor Sri Bandyopadhyay specialises in nanotechnology, polymer science & engineering, fly ash recycling technology, composites characterisation micro-macro-nano.
Australian Manager and CI-1, AISRF TA020004 project "Nanocomposites in clean energy – generation, storage and savings" with 6 Australia CIs (three of them are federation fellow), plus 6 CIs from India (two of them are directors of India's very prestigious national laboratory / institute). The annual report sent on 30 April 2011 highlights the following achievement for the project: journal papers achieved were 4 x the set milestones by DIISR. Also all major milestones were achieved through Sri's interaction with the entire team i.e. 12 CIs of the project.

In 2011, Associate Professor Bandyopadhyay taught 6 courses on nanotechnology, polymer science & engineering, fracture mechanics & fractography. Sri was ranked by students as the Best Lecturer in the School as well as the entire Faculty of Science for his teaching of polymer courses i.e. MATS3443 & MATS3564. In the latter course, Sri scored 100 % in all 10 CATEI teaching items.

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Sri's publications include 2 invited refereed book chapters, 2 books from Ph D theses, 6 refereed journal papers, 1 refereed conf paper, plus 3 IPs (of total 7) published on iBridge by NSi in Nov 2011.

World Academic Publishing Company appointed Sri as the Editor-in-Chief of the new quarterly on-line scientific journal 'International Journal of Energy Engineering.'

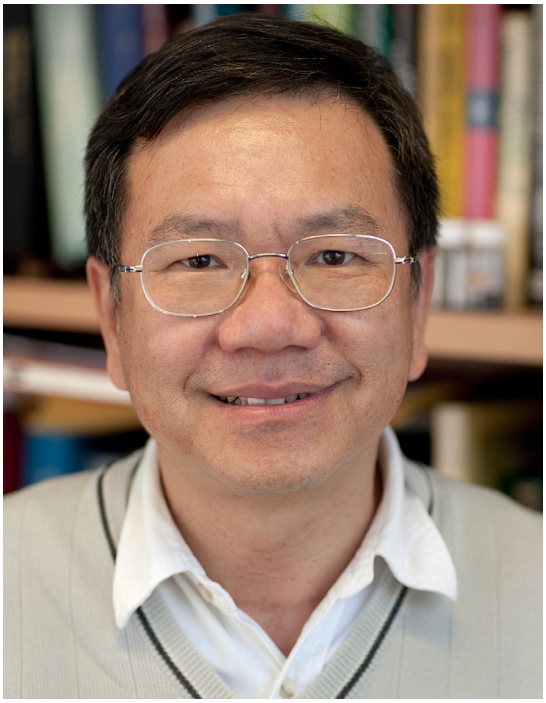
In October 2011, Sri organised a top level delegation visit from India to UNSW, led by the Cabinet Secretary of a ministerial department Mr Jose Cyriac, and Director General CIPET Prof Dr S K Nayak, who came to meet UNSW top management Acting Vice Chancellor Prof Richard Henry AM and senior – most researchers in UNSW including HoS Prof Mark Hoffman. The visit was oragnised by Sri Bandyopadhyay, through the office of Pro-VC International Ms Jennie Lang.

In November 2011, Sri was successful in 2012 ARC DP application fund on 'Durability of Carbon Fibre Reinforced Polymer (CFRP) strengthened steel structures against environment-assisted degradation', with Monash University/NCSU, the team being team X-L Zhao, R. Singh, Y. Bai, S. Bandyopadhyay, S. Rizkalla. Sri Bandyopadhyay, as Chair, and the ARCDP team initiated the concept ACUN-6 international composites conference on 'Composites & nanocomposites in civil, mining and chemical infrastructures' to be held at Monash University in 2012.

The Director of US Govt Organisation International Clean Water Institute (ICWI) invited Sri to be the Australian Co-Director of the IWCI.

Associate Professor

Sammy Chan



Professional Experience

Associate Professor, School of Materials Science & Engineering, UNSW 2009-
Senior Lecturer, School of Materials Science & Engineering, UNSW 2003-2008

Awards & Memberships

Fellow, Institute of Materials, Minerals and Mining, UK
Fellow, Australian Institute of Energy
Chartered Engineer, UK
Chartered Scientist, UK
Professional Member, Chinese Society for Materials Science
Co-editor, "Materials Chemistry and Physics"

Research Contribution

My research interests are in the areas of energy-materials, hydrogen storage and metal matrix composites (MMCs). Major contributions to the fields are:
(1) Identification of hydrogen trapping ability in different microstructures to provide a better understanding on the hydrogen embrittlement of steel.
(2) Application of Ni encapsulation on hydrogen storage alloys in the preparation of Ni-MH battery electrodes using sintering rather than via the paste method, so that the conductivity of the electrodes can be largely enhanced.
(3) Synthesis of nanostructured Ni(OH)2 with the performance of nickel electrodes increased by 30% in capacity.
(4) Development of aluminium matrix composites with nano-reinforcements. With only 1% of these reinforcements, the tensile properties of the composites are better than or comparable to those of composites with 10% micrometric reinforcements. The composites also have a very high creep resistance up to 0.8 of their melting points.
Publications include 5 book chapters, 70+ refereed journal papers and similar number of conference papers.

Teaching Contribution

Courses are taught in the areas of Nanotechnology (Nanotechology II, Nanotechology III, Advanced Nanomaterials), Mechanical Properties of Materials, Corrosion and Corrosion Control, Surface Treatment and Wear, Specialty Alloys, Materials Design and Applications. The teaching receives excellent evaluations from students. Supervision of 17 postgraduate students and 20 Honours students since coming to UNSW. 8 postgraduates have graduated already.

Selected Publications

- P.J. Tsai, T.C. Chiu, P.H. Tsai, K.L. Lin, K.S. Lin and S.L.I. Chan: "Carbon Nanotube Buckypaper/MmNi5 Composite Film as Anode for Ni/MH batteries", International Journal of Hydrogen Energy, 37 (2012) pp. 3491-3499.
- W. Weng, Z.M Wang, C.Y.V. Li, S.L.I Chan, "Effect of Electrolyte on Electrochemical Characteristics of MmNi3.55Co0.72Al0.3Mn0.43 Alloy Electrode for Hydrogen Storage", International Journal of Hydrogen Energy, 34, (2009) pp. 5422-5428.
- C.Y.V. Li, Z.M. Wang and S.L.I. Chan, "Hydrogen Storage in Carbon Nanotubes", in Chemistry of Carbon Nanotubes (V.A. Basiuk and E.V. Basiuk, Eds.), American Scientific Publishers, Vol. 1, pp. 187-216. (2008) ISBN : 1-588883-129-9.
- Q.S. Song, G.K. Aravindaraj, H. Sultana and S.L.I. Chan, "Performance Improvement of Pasted Nickel Electrodes with Multi-wall Carbon Nanotubes for Rechargeable Nickel Batteries", Electrochimica Acta, 53 (2007) 1890-1896.
- Z.G. Lin, S.L.I. Chan and F.A. Mohamed, "Effect of Nano-scale Particles on the Creep Behaviour of 2014 Al", Materials Science & Engineering A, 394 (2005) 103-111.
- Q.S. Song, Z.Y Tang, H.T. Guo and S.L.I. Chan, "Structural Characteristics of Nickel Hydroxide Synthesized by a Chemical Precipitation Route under Different pH Values", Journal of Power Source, 112 (2005) 428-434

Professor

Alan Crosky

Professional Experience

Professor, School of Materials Science & Engineering, UNSW, 2006-

Lecturer/Senior Lecturer/ Associate Professor, UNSW, 1987-2005

Honorary Professor, University of Wales, Swansea, UK, 2006-2010

Visiting Professor, ENSAIT, France, 2008

Visiting Professor, Cambridge University, UK, 2005

Visiting Professor, University of Wales, Swansea, UK, 2005

Visiting Professor, Interdisciplinary Research Centre, University of Wales, Swansea, UK, 2000

Materials and Processing Engineer/Senior Materials and Processing Engineer, Hawker de Havilland 1978-1986

Visiting Engineer F/A 18 program, Cleveland Pneumatic, USA, 1982

Visiting Engineer, Rolls Royce Ltd 1980

Teaching Contribution

Courses taught are Fundamentals of Materials Engineering (large class first year engineering students), Metal Forming, Fractography, Welding and Composites. First year engineering course is UNSW exemplar and was UNSW nomination for Blackboard Exemplary Course Project in 2007. Received a Carrick Citation in 2007 (as team leader with M. Hoffman, P. Munroe & B. Allen). Led a 3 year $300k faculty project on dissemination of best practice in learning and teaching.

Research Contribution

Research has focused on the effect of structure (both micro and macro) on mechanical behaviour. Specific areas of research include directed fibre placement in fibre reinforced plastic composites, failure of composites, natural fibre composites, wood plastic composites, agro biochar, ageing behaviour in aluminium alloys and failure analysis. Recognition of this includes: 150 papers in international journals and conferences; $2 m research funding since 2007; 8 PhD/ME completions since 2007; Program Leader, CRC for Advanced Composite Structures.

Awards & Memberships

Awarded Best Paper in 2006 in the International Journal of Composite Structures.

Selected Publications

- Buha, J., Lumley R.N., Crosky, A.G., Hono, K, (2007) "Secondary precipitation in an Al-Mg-Si-Cu alloy", Acta Materiala, 55(9), 3015-3024.
- Park, B.G., Crosky, A., Hellier, A.K., (2008) "Fracture toughness of microsphere Al2O3-Al particulate metal matrix composites", (2008) Composites B, in press: JCOMB956.
- Buha, J., Lumley R.N., Crosky, A.G., (2008) "Secondary ageing in an aluminium alloy 7050", (2008) Materials Science & Engineering A, 492(1-2), 1-10.
- Li, R., Huong, N., Crosky, A., Mouritz, A., P., Kelly, D., Chang, P., (2009) "Improving bearing performance of composite bolted joints using z-pins", Composites Science and Technology 75(1-4) 524-531.
- Allen, B,. Crosky, A., McAlpine, I., Hoffman, M., Munroe, P., "A blended approach to collaborative learning: making large group teaching more student-centred", Submitted, International Journal of Engineering Education, 28(3), 569-576.
- Allen, B., Crosky, A., (2009) "Learning Styles and Constructing Understanding - Why learning theory matters to Materials Engineering educators", Journal of Materials Education, 31(1-2) 117 – 130.
- Downie, A., Munroe, P., & Crosky, A. (2009). Chapter 2: Characteristics of Biochar – Physical and Structural Properties. In J. Lehmann & S. Joseph (Eds.), Biochar for Environmental Management: Science and Technology: Earthscan.
- Crosky, A., Grant C., Kelly, D., Fibre Placement, in press, Encyclopedia of Composites, John Wiley 2012.

Lecturer

John Daniels

Professional Experience

Lecturer, Materials Science and Engineering, UNSW, 2010-
Australian Institute of Nuclear Science and Engineering Research Fellow, UNSW, 2010-
Research Associate, European Synchrotron Radiation Facility, Grenoble, France, 2007-2010

Teaching Contribution

Mechanical Properties of Materials

Selected Publications

- John E. Daniels, Wook Jo, Jürgen Rödel, Daniels Rytz, Wolfgand Donner, "Structural origins of relaxor behaviour in a BNT-4%BT single crystal under electric field", Applied Physics Letters, 98, 252904 (2011)
- A. Steuwer, J.E. Daniels, "In-situ strain measurements around cracks using synchrotron X-ray diffraction", The Journal of Strain Analysis for Engineering Design, 46, 593 (2011)
- Abhijit Pramanick, Dragan Damjanovic, John E. Daniels, Juan C. Nino, and Jacob L. Jones, "Origins of electro-mechanical coupling in polycrystalline ferroelectrics", Journal of the American Ceramic Society, Feature Article, 94, 293-309 (2011)
- Rui Ping Hoo, Peter Fratzl, John E. Daniels, John W.C. Dunlop, Veijo Honkimäki, Mark Hoffman, "Cooperation of length scales and orientations in the deformation of bovine bone" Acta Biomaterialia, 7, 2943-2951 (2011)
- A.J. Royles, A.J. Bell, J.E. Daniels, S.J.Milne, T.P. Comyn, "Observation of a time-dependent structural phase transition in potassium sodium bismuth titanate", Applied Physics Letters, 98, 182904 (2011)
- Wook Jo, John E. Daniels, Jacob L. Jones, Xiaoli Tan, Pamela A. Thomas, Dragan Damjanovic & Jürgen Rödel, "Evolving Morphotropic Phase Boundary in Lead-Free Bi0.5Na0.5) TiO3 – BaTiO3 Piezoceramics", Journal of Applied Physics, 109, 014110 (2011)

Awards & Memberships

Australian Institute of Nuclear Science and Engineering Research Fellowship, University of New South Wales, 2010.
Edward C. Henry Award (2010) by the Electronics Division of the American Ceramic Society. The award reflects the research paper judged best in originality of content, scientific and technical merit, and quality of presentation.
Mollie Holman Doctoral Medal, awarded by the Monash Research Graduate School for the best doctoral theses within the faculty of Science for a given year, Monash University, 2007.
Australian Institute of Nuclear Science and Engineering (AINSE) gold medal award for excellence in research, 2007.

Research Contribution

John's research focuses on the understanding of the structural origin of physical properties of materials. To date, this research has been primarily directed in the field of electro-mechanical materials where a wide range of underlying structural processes at different length scales leads to the coupling of mechanical load and electrical charge. Further understanding in this area is aimed at improving the quality and range of applications of these materials, which are already used in devices such as ultrasonic imaging transducers and nano-positioning systems. Structural characterization measurements associated with this work are carried out at both neutron and synchrotron X-ray facilities in Australia and abroad. In particular, the Australian Nuclear Science and Technology Organizations, OPAL research reactor in Sydney, and the European Synchrotron Radiation Facility in France are used. John is also applying these advanced structural characterization techniques to understanding mechanical deformation in structural nuclear materials and natural biological nano-composites. John Currently supervises 3 honours students, one Masters by Research student, and two PhD students on associated projects.

Professor

Michael Ferry

Professional Experience

Professor, School of Materials Science & Engineering, UNSW 2008-

Deputy Director, ARC Centre of Excellence for Design in Light Metals 2005-

Associate Professor, School of Materials Science & Engineering, UNSW 2004-07

EPSRC Senior Fellow, School of Materials, University of Manchester, UK 2004

Visiting Fellow, Department of Materials Engineering, University of Cambridge, UK 2002

Senior Lecturer, School of Materials Science & Engineering, UNSW 2000-03

Lecturer, Department of Materials Engineering, University of Wollongong 1996-99

EPSRC Postdoctoral Fellow, School of Materials, University of Manchester 1994-96

Materials Engineer, Alcan Australia Limited 1989-94

Awards & Memberships

2007 - Fellow of Institution of Engineers, Australia (FIEAust)

2006 - Fellow of Institute of Materials, Minerals and Mining (FIMMM)

2002 - UNSW European Fellowship, University of Cambridge, UK

1996 - Chartered Engineer (UK) (CEng)

1996 - Chartered Professional Engineer (Australia) (CPEng)

1996 - Member of Institute of Materials Engineering, Australia (IMEA)

1996 - Member of Minerals, Metals and Materials Society, USA (TMS)

Teaching Contribution

Courses taught are in the areas of: Physical Properties of Materials; Thermodynamics & Phase Equilibria; Crystallography; X-ray Diffraction; Dislocation Theory; Physical Metallurgy; Phase Transformations, and Thermomechanical Processing.

Research Contribution

My research interests are concerned mainly with the mechanisms of microstructure and texture evolution during solidification, solid-state phase transformation and deformation & annealing with recent emphasis on the mechanical and physical properties **of** crystalline and amorphous light metals. Current researches include:

- Development of new classes of bulk metallic glasses (BMGs)
- Processing and properties of BMGs and their composites
- Thermoplastic forming of BMGs
- Production and properties of biocompatible BMG components
- Recovery/recrystallization mechanisms in deformed single-phase and two-phase alloys
- Design of multilayered hybrid sheet structures for optimising mechanical properties
- Development of microstructure and texture in materials by thin-strip casting
- 3D-EBSD of crystalline materials

Publications include ~180 papers in international journals and conference proceedings, 5 book chapters and a sole-authored book on direct strip casting of metals and alloys. Since 2000, substantial research funding has been generated from various sources and 12 HDR students have completed theses in the past 5 years. I am Deputy Director (Ed&T) and Program Leader (Program A) in the ARC Centre of Excellence for Design in Light Metals.

Selected Publications

K.J. Laws, K.F. Shamlaye, K. Wong, B. Gun and M. Ferry (2010). Prediction of glass forming compositions in metallic systems: copper-based bulk metallic glasses in the Cu-Mg-Ca system. Metallurgical and Materials Transactions A, 41, pp. 1699-1705.

M.Z. Quadir, O. Al-Buhamad, L. Bassman and M. Ferry (2007). Development of recovered/recrystallized microstructure in Al alloys by accumulative roll bonding. Acta Materialia. 55, p.5438.

M. Ferry (2006). Direct Strip Casting of Metals and Alloys. Book published by CRC Press LLC, New York, USA & Woodhead Publishing Limited, Cambridge, UK.

M. Ferry, N.E. Hamilton, N.E. and F.J. Humphreys (2005). Continuous and discontinuous grain coarsening in a fine grained particle-containing Al-Sc alloy. Acta Materialia. 53, p.1097.

Head of School & Professor

Mark Hoffman

Prof. Mark Hoffman is the Head of School at the School of Materials Science and Engineering and the Associate Dean Research in the Faculty of Science at the University of New South Wales. He is currently the Presiding Member of the University's Committee on Research, Director of the International Congress on Fracture, a Research Program Leader for the ARC Centre of Excellence in Design in Light Metals, a member of the Services and Strategy Committee for Intersect and Associate Editor of the Journal of the American Ceramic Society. In 2011, he was made a Fellow of the Institute of Engineers Australia.

Prof. Mark Hoffman obtained his Bachelor in Mechanical Engineering and PhD Materials Science from The University of Sydney in 1994. In 2005 he obtained a Masters of Business & Technology from the University of New South Wales. He has held postdoctoral and research positions at the University of California, Berkeley, Tokyo Metropolitan University, the Technical University Darmstadt, Germany, and the Indian Institute of Science, Bangalore. He commenced at UNSW in 1997 as a lecturer in the School of Materials Science and Engineering.

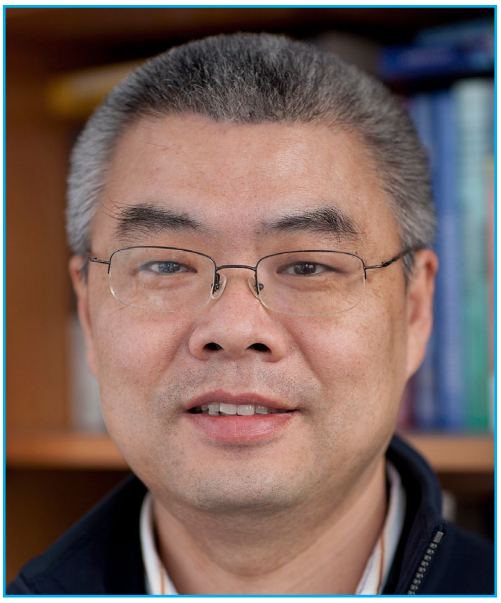
Prof. Mark Hoffman's research expertise is in the area of structural integrity of materials, specifically the design of materials for high reliability in complex environments through a combination of computational modelling and investigation using an extensive mechanical property research laboratory at UNSW. His research covers fracture mechanics, fatigue, and wear and tribology from the macro- to nano-scale.

Prof. Mark Hoffman teaches in the areas of Finite Element Modelling, Fracture Mechanics, Thermal and Mechanical Properties of Ceramics, Mechanical Behaviour of Materials, Surface Treatments and Wear and Management in the Materials Industry. He has received a UNSW Vice-Chancellors Award for Teaching Excellence in Undergraduate Teaching for the development of online engineering materials tutorials. He also received a Carrick Citation Teaching award in 2007. He chairs the Education Committee on the National Council of Materials Australia.

Prof. Mark Hoffman has obtained over $11m in research funding from the Australian Research Council and has been co-investigator on grants from bodies including the US NSF, the German DFG, the Hong Kong Science and Technology Fund, Science Foundation Ireland and Thai government schemes. He has led 5 major contract research projects with local and international industry. He has published over 190 refereed papers including 154 in international journals. He has graduated 20 PhD and Masters students and currently supervises a group of 14 including 7 PhD students. In 2007 he received the UNSW Vice-Chancellors Award for Excellence in Postgraduate Supervision. He has hosted 7 international visiting researchers in the past 2 years.

Professor

Sean Li



Professional Experience

Professor, School of Materials Science & Engineering, UNSW, 2012-Present

Australian Future Fellow, Australian Research Council, 2010-present

Associate Professor, School of Materials Science & Engineering, UNSW, 2009-2011

Senior Lecturer, School of Materials Science & Engineering, UNSW, 2007-2009

Lecturer, School of Materials Science & Engineering, UNSW 2004-2007

Assistant Professor, Nanyang Technological University (Singapore), 1998-2004

Adjunct Fellow, Institute of Environmental Science and Engineering (Singapore), 2002-2004

Research Associate, University of Wollongong, 1997-1998

Teaching Contribution

Professor Sean Li is currently teaching the courses of MATS1354, MATS1101 and ENGG1000 in the school and faculty of engineering. His research interest covers multifunctional materials, energy materials, defence materials and biophotonic materials.

Awards & Memberships

2010 – Australian Future Fellow

2006 - Vice-Chancellors Teaching and Research Award

2005 - Committee Member of Electronic Division, American Ceramic Society.

2004 - Excellence in Teaching Award 2004, Nanyang Technological University Singapore

Research Contribution

Professor Sean Li is currently leading a research group, which consists of 8 full time research fellows, 13 Ph.D. students and 4 M.Sc. students, to work in the research areas of advanced electronic, photonic and multifunctional materials. The research activities of his research group are well funded. Professor Li has published more than 200 scientific articles in international peer-reviewed journals with h-index of 27. He is a referee for 32 journals including "Coordination Chemistry Reviews", "ACS Nano", "Chemistry of Materials", "The Journal of Physical Chemistry", "Applied Physics Letters" etc. prestigious/primary journals, and also the assessor of research programs for several countries.

Selected Publications

Z.M. Ao, and S. Li, "Hydrogenation of Graphene and Hydrogen Diffusion Behavior on Graphene/Graphane Interface" in "Graphene Simulation", edited by J.R. Gong (ISBN 978-953-307-556-3), InTech, Vienna, Austria, 53 – 74 (2011).

C.C. Yang and S. Li, "Basic Principles for Rational Design of High Performance Nanostructured Silicon-Based Thermoelectric Materials", Chemical Physics and Physical Chemistry 12, 3614-3618 (2011).

P. H. Tsai, T. S. Zhang, R. Donelson, T. T. Tan, S. Li, "Power factor enhancement in Zn-doped Na0.8CoO2", Journal of Alloys and Compounds 509, 5183-5186 (2011).

Professor Paul Munroe

Professor Paul Munroe is the Director of the UNSW Electron Microscope Unit and a Professor in the School of Materials Science and Engineering. He completed a BSc (Hons) and PhD in Metallurgy and Materials at the University of Birmingham in the UK before spending three years at Dartmouth College in New Hampshire as a Research Assistance Professor. He came to Australia in 1990 to take up a position at the University of New South Wales. He was promoted to full professor in 2003.

He is responsible for the publication of a significant body of work, totalling over 300 journal papers. In the past 10 years, he has averaged about 15 journal papers a year in high-impact-factor journals. This work has attracted over 4,000 citations and has a H-Index of 31. His research is mostly focused on the characterization of materials using electron microscopy and related methods. This includes the publication of a significant body of work, about 50 journal papers, on focused ion beam technology. This work has received recognition through invitations to address many international conferences. He is current active in a range of areas of materials characterization of materials such as functional thin films, intermetallic alloys and biochars.

He currently serves as an Associate Editor for "Materials Characterization" and he is on the editorial board of a number of other journals including "Microscopy Research and Technique". He was awarded the Cowley-Moodie Award from the Australian Microscopy and Microanalysis Society for 'outstanding physical sciences electron microscopy'.

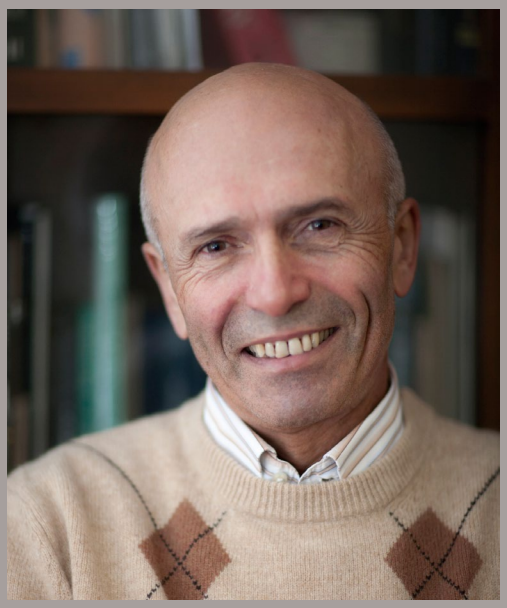
Paul has won a large number of ARC grants across a range of schemes and funding programs. He has secured over $20M in research funding.

Professor Munroe was one of the founding architects of the NCRIS-funded Australian Microscopy and Microanalysis Research Facility (AMMRF). He currently serves as the facility's Technical Director and plays a major leadership role in the operation of the facility.

Paul is also an accomplished teacher. He holds a Graduate Diploma in Higher Education from UNSW. He has been awarded a number of teaching grants, including funds awarded by ALTC. These funds have led to the development and implementation of a very successful suite of computer-based modules for the teaching of materials engineering and a suite of interactive on line training tools for teaching microscopy. Paul won the UNSW Vice-Chancellor's Award for Excellence in Teaching in 2004 and a highly prestigious Carrick Citation from the Australian Learning and Teaching Council.

Professor

Oleg Ostrovski



Professional Experience

ARC Professorial Fellow, UNSW, 2007- 2012
Head of School, School of Materials Science & Engineering, UNSW 2004 - 2007
Professor, UNSW, 2001- 2003
Associate Professor/Senior Lecturer, UNSW, 1993-2000
Professor, Moscow Steel & Alloys Institute, 1990-1993
Head of Metallurgical Research Laboratory, Moscow Steel & Alloys Institute, 1986-1991
Research positions, Moscow Steel & Alloys Institute, 1973-1985
Visiting professorial positions at the University of Tokyo 1992 and 2010, La Trobe University, Bendigo 1992,
Norwegian University of Science and Technology 1999, SINTEF, Norway 2009

Awards & Memberships

2007–ARC Professorial Fellowship
2004 – Benjamin F Fairless award (Association for Iron and Steel Technologies, USA) for "Excellence in the application of fundamental research to the improvement of steelmaking processes and for energetic and innovative leadership to steelmaking community".
1985 – Soviet Union Government award "The Council of Ministers of the USSR Prize" for development of cost-efficient technologies for high alloy steels
Editorial Board Member
High Temperature Materials and Processes
Electrometallurgy
Advisory Board Member - ISIJ International 2004-2006

Selected Publications

- D.K. Belashchenko and O. Ostrovski (2001) Molecular Dynamics Simulation of Oxides with Ionic-Covalent Bonds, Thermochimica Acta, 372 (1-2), 143-152.
- J. Zhang and O. Ostrovski (2001) Cementite Formation in CH4-H2-Ar Gas Mixture and Cementite Stability, ISIJ International, 41 (4), 333-339.
- E. Park, J. Zhang, S. Thomson, O. Ostrovski and R. Howe (2001) Characterisation of Phases Formed in the Iron Carbide Process by X-Ray Diffraction, Mossbauer, X-Ray Photoelectron Spectroscopy, and Raman Spectroscopy Analyses, Metallurgical and Materials Transactions B, 32B (5), 839-845.
- M.M. Yastreboff, O. Ostrovski and S. Ganguly (2003) Effect of Gas Composition on the Carbothermic Reduction of Manganese Oxide, ISIJ International, 43 (2), 161-165.
- A. Adipuri, G. Zhang and O. Ostrovski (2008) Chlorination of Titanium Oxycarbide Produced by Carbothermal Reduction of Rutile, Metallurgical and Materials Transactions B, 39B (1), 23-34.
- M. Dewan, G. Zhang and O. Ostrovski (2009) Carbothermal Reduction of Titania in
- Different Gas Atmospheres, Metallurgical and Materials Transactions B, 40B (1), 62-69.

Research Contribution

Major contributions are in the field of pyrometallurgical technologies for minerals processing, iron-, steel-, and ferroalloy-making. Areas of research include thermodynamics, kinetics and mechanisms of metallurgical reactions; properties of molten metals and slags; reduction, smelting and refining processes, environmental issues in pyrometallurgy. In 2006-2010, 37 papers were published in international journals; research funding exceeded $2M; 6 PhD and 1 Masters projects were completed.

Scientia Professor

Veena Sahajwalla

Professional Experience

ARC Future Fellow 2010-

Scientia Professor, UNSW, 2009 -

Director, Centre for Sustainable Materials Research and Technology, UNSW, 2008 –

Associate Dean (Strategic Industry Relations), Faculty of Science, UNSW, 2007 –

Visiting Professor, University Malaysia Perlis, 2006 -

Professor (since 2004); Associate Professor (2001-04); Senior Lecturer (1996-2001); Lecturer (1994-96), UNSW'

Teaching Contribution

Courses taught are in the areas of Fluid Flow, Pollution Control and runs the undergraduate 1st year Materials Conference.

Research Contribution

Professor Veena Sahajwalla in close collaboration with OneSteel, has established a method by which an intractable, carbon-rich waste product can be successfully supplanted for a natural resource in Electric Arc Furnace (EAF) steelmaking. In addition to being without detriment to furnace functioning or the finished product, her research has shown that carbon from recycled scrap rubber tyres can produce a more stable foamy slag compared to coke only – greatly improving furnace energy efficiency. Successfully incorporated into commercial-scale industrial furnaces operated by OneSteel over the past 4 years, this technology has now been commercialised under licence to international EAF steelmakers. The world-First Polymer Injection Technology was named on the list of 2012 List of Innovations that Could Change the Way we manufacture by the Society for Manufacturing Engineers.

OneSteel implemented the first commercial implementation of this technology outside of Australia at UMC Metals in Thailand in May 2011 and is in discussions with Steelmakers from Asia – South Korea, Thailand, India, Taiwan; Europe – Italy and the Americas – United States, Canada and Brazil regarding implementations in those countries..

Awards & Memberships

2011 National winner Nokia Business Innovation Award

2011 Pravasi Bharatiya Samman Award, (outstanding achievement in the field of Science), Government of India

2009 Joseph Kapitan Award for the best cokemaking paper ('Effect of coke minerals and carbon structure on coke behaviour in the Ruukki blast furnace'), AIST.

Joint Winners – OneSteel & UNSW 2009 Australian Steel Institute Sustainability Award.

2009 NSi Inventor of the Year in the Science/Engineering Category.

2008 New South Wales Scientist of the Year Award, category Engineering Science.

2006 Environmental Technology Award, ('Waste plastics – a resource for EAF steelmaking'), AIST.

2006 Charles Briggs Award, for the best paper in electric steelmaking ('Influence of carbonaceous materials on slag foaming behaviour during EAF steelmaking'), AIST.

2005 Eureka Prize for Scientific Research, for innovations in recycling waste plastics in steelmaking, Australian Museum.

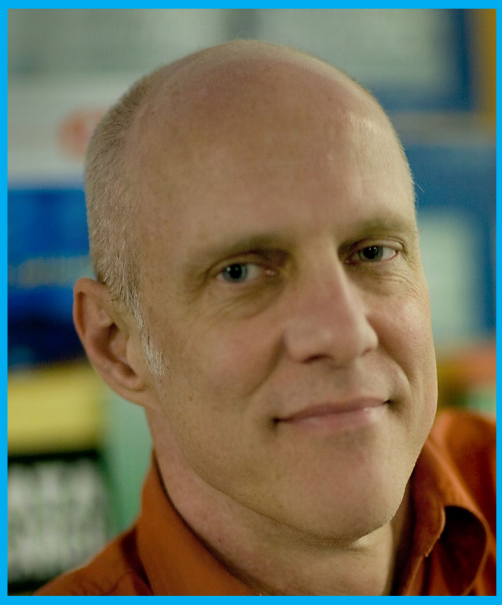
Memberships and Learned Academies

Fellow of the Australian Academy of Technological Sciences and Engineering (2007), the premier national institution for the advancement of engineering and technology, for 'achievements as an exceptional, innovative engineer with an established record of successful conversions of research to high-value products'. Link: http://www.unsw.edu.au/news/pad/articles/2007/nov/ATSE_Fellows.html

Fellow of the Institution of Engineers Australia (since 2005)

Professor

Chris Sorrell



Professional Experience

Professor, School of Materials Science & Engineering, UNSW 1997-Present
Associate Professor, School of Materials Science & Engineering, UNSW 1992-96
Senior Lecturer, School of Materials Science & Engineering, UNSW 1989-91
Lecturer, School of Materials Science & Engineering, UNSW 1987-89

Teaching Contribution

MATS1112 Phase Equilibria
MATS1142 Crystallography and X-Ray Diffraction
MATS1163 Chemistry of the Solid State
MATS1244 Materials Industry Management A
MATS1464 Professional Communication and Presentation
MATS2013 Ceramic Materials
MATS2183 Refractories
MATS2008 Thermodynamics and Phase Equilibria
MATS2263 Sintering of Ceramics
MATS2294 Thermal and Mechanical Properties of Ceramics
MATS2314 Glass-Based Ceramics
MATS3002 Fundamentals of Ceramic Processing

Awards

2010 Commendation (A. Nakaruk and C.C. Sorrell), 4th Outstanding Student Award, Green Electronics, Taiwan Semiconductor Manufacturing Company, Hsinchu, Taiwan
2011 February Finalist, (D.A.H. Hanaor and C.C. Sorrell), Sapphire Award, Journal of Materials Science (winner to be announced in November)

Memberships

1981- Member Australian Ceramic Society
2003-2009 State Representative Hydrogen Division, Australian Institute of Energy
2003- Fellow Australian Institute of Energy
2009-Member Australian Association for Hydrogen Energy

Research Contribution

The main focus of research has been in the processing of ceramics, including fabrication, forming, and densification of bulk materials, thick films, and thin films.

Main Research Themes

Phase Equilibria	1976-Present
Crystal Growth	1977-80
High-Temperature Superconductivity	1987-00
Bioceramics	1989-01
Microwave Heating of Ceramics	1997-04
Gas Sensors and Fuel Cells	1998-01
Photocatalytic Titania	1999-Present
Outputs (Last 5 Years)	
Publications:	40
Grants:	$ 5.41 million
Postgraduate Student Completions:	9

Selected Publications

- C.C. Sorrell, H. Taib, T.C. Palmer, F. Peng, Z. Xia, and M. Wei, "Hydroxyapatite and Other Biomedical Coatings by Electrophoretic Deposition", pp. 81-135 in Biological and Biomedical Coatings Handbook: Processing and Characterization. Edited by S. Zhang. CRC Press, Boca Raton, FL, 2011.
- [3] A. Nakaruk and C.C. Sorrell, "Conceptual Model for Spray Pyrolysis Mechanism: Fabrication and Annealing of Titania Thin Films", J. Coat. Technol. Res., 7 [5] 665-76 (2010).
- [4] D.A.H. Hanaor and C.C. Sorrell, "Review of the Anatase to Rutile Phase Transformation", J. Mater. Sci., 46 [4] 855-74 (2011).
- [5] K.-T. Lau and C.C. Sorrell, "Electrophoretic Mobilities of Dissolved Polyelectrolyte Charging Agent and Suspended Non-Colloidal Titanium during Electrophoretic Deposition", Mater. Sci. Eng. B, 176 [5] 369-81 (2011).
- [6] D.A.H. Hanaor and C.C. Sorrell, "Review of the Anatase to Rutile Phase Transformation", J. Mater. Sci., 46 [4] 855-74 (2011).

Deputy Head of School & Senior Lecturer

Owen Standard

Professional Experience

Deputy Head of School, School of Materials Science & Engineering, UNSW, 2009-

Senior Lecturer, School of Materials Science & Engineering, UNSW, 2002-

Lecturer, School of Materials Science & Engineering, UNSW, 1997-2002

Visiting Researcher, Institute of Science and Technology for Ceramics – Centre of National Research (ISTEC-CNR), Faenza, Italy, 2006

Australian Research Council Postdoctoral Research Fellow, School of Materials Science & Engineering, UNSW, 1994-1997

Research Scientist, CRC for Eye Research & Technology, UNSW, 1993-1994

Teaching Contribution

Courses are taught in the following areas: metallography and microstructural analysis, crystallography and X-ray diffraction, ceramic materials, ceramic processing and design, mechanical properties of biomaterials, and materials industry management. Undergraduate program coordinator of the School BE, BE/BE, and BE/MBiomedE degrees. Coordinator of the Co-op Scholarship Program in Materials Science & Engineering.

Research Contribution

Overall research processing-microstructure-property relationship of advanced ceramics for functional applications and include: colloidal processing of electroceramics, compositional and microstructural modification of bioactive and bioinert ceramics for orthopaedic and dental applications, sol-gel deposition of functional ceramic coatings for electronic applications, development of functional (sol-gel) coatings on textile fibres, and ceramic coatings on biomedical alloys.

Awards & Memberships

Associate Editor, Journal of the Australasian Ceramic Society, 2006-

Editor, Newsbulletin of the Australasian Ceramic Society, 1997-2000

Member, Advisory Panel on Orthopaedic Devices, Therapeutic Device Evaluation Committee, Therapeutic Goods Administration, ACT, Australia, 2001-2003

Associate Professor

Nagarajan Valanoor

Professional Experience

Assoc. Professor,Senior Lecturer/Lecturer, School of Materials Science & Engineering, UNSW 2005-current

Alexander von Humboldt Research Fellow, Forschungszentrum Juelich Germany, 2003-2004

Visiting Researcher, National University Singapore 2006

Visiting Researcher, University of Maryland (USA) 2005

Teaching Contribution

Courses taught are in the areas of Diffusion and Kinetics, Advanced Nanomaterials, Introduction to Materials Design and Nanotechnology, Solid State Chemistry and Nanofabrication.

Awards & Memberships

- Edgeworth David Medal 2010
- International Symposium for Integrated Functionalities Young Investigator Award 2010
- Australian Research Fellowship (twice-2006-2010 and 2010-present)
- Australian Research Council Fellow, 2006 – present
- Member of Materials Research Society, 1999 – present

Research Contribution

Most significant contributions are in the field of thin film epitaxy-functional property relationships for ferroelectrics, dielectrics and multiferroic nanomaterials. Areas of research include thin-film oxide epitaxy, scanned probe microscopy of functional materials and Landau-Ginzburg modelling of phase-transitions. Recognition of this includes: 60+ papers in international journals; $4m research funding since 2005.Currently supervising 7 PhD; completed 1 MSc since starting at UNSW.

Selected Publications

- "Theory of Giant Electromechanical Response from Ferroelectric Bilayers with Polydomain Structures due to Interlayer and Interdomain Coupling" R. Mahjoub, S. P. Alpay and V. Nagarajan, Physical Review Letters 105, 197601 (2010)
- "Crossing an interface: Ferroelectric control of tunnel currents in magnetic complex oxide heterostructures" M. Hambe, A. Petraru, N. A. Pertsev, P. Munroe, V. Nagarajan and H. H. Kohlstedt, Advanced Functional Materials 20, 2436 (2010)
- "Direct evidence for cation non-stoichiometry and Cottrell atmospheres around dislocation cores in functional oxide interfaces." M. Arredondo, Q. M. Ramose, M. Weyland, R. Mahjoub, I. Vrejoiu, D. Hesse, N. D. Browning, M. Alexe, P. Munroe, and V. Nagarajan, Advanced Materials 22, 2430 (2010)
- "Universal behavior and electric field-induced structural transition in rare-earth substituted BiFeO3", D. Kan, L. Pálová, V. Anbusathaiah, C. J. Cheng, S. Fujino, V. Nagarajan, K. M. Rabe, and I. Takeuchi, Advanced Functional Materials 20,1108 (2010).

Lecturer

Danyang Wang

Professional Experience

Lecturer, School of Materials Science and Engineering, UNSW, 2011- present

Vice-Chancellor's Postdoctoral Fellow, School of Materials Science and Engineering, UNSW, 2009-2011

Postdoctoral Fellow, Risø National Laboratory for Sustainable Energy, Technical University of Denmark, 2008-2009

Research Associate, The Hong Kong Polytechnic University, 2006-2008

Teaching Contribution

MATS2008 Thermodynamics and Phase Equilibria

MATS2294 Thermal and Mechanical Properties of Ceramics

NANO1001 Nanotechnology I

NANO3101 Advanced Nanomaterials

NANO3420 Fabrication of Nanostructured Devices

Awards & Memberships

UNSW Vice-Chancellor's Postdoctoral Fellowship

Co-Editor of special issue in Key Engineering Materials for Electroceramics

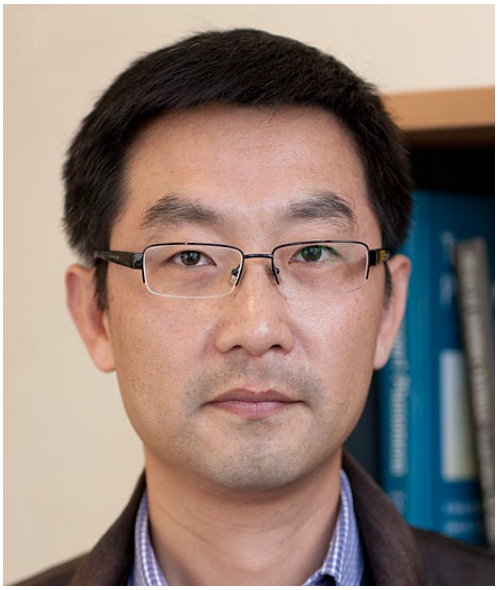
Member of Materials Research Society Singapore

Research Contribution

Most significant contributions are in the field of growth and characterization of functional oxide thin films for ferroelectric, piezoelectric, electro-optic and dielectric applications. Areas of research include: Thin film technology and physics; Functional materials and devices; Micro/nanofabrication techniques; Structural analysis and x-ray physics. Recognition of this includes ~50 papers in international journals, 2 book chapters and a number of conference proceedings. Dr. Wang is currently supervising two PhD students, one exchange PhD student and one Master student, and has supervised to completion one MSc since starting at UNSW.

Selected Publications

- D. Y. Wang, N. Y. Chan, R. K. Zheng, C. Kong, D. M. Lin, J. Y. Dai, H. L. W. Chan and S. Li, "Multiferroism in orientational engineered (La, Mn) co-substituted BiFeO3 thin films", Journal of Applied Physics, 109, 114105 (2011)
- D. Y. Wang, D. M. Lin, K. W. Kwok, N. Y. Chan, J. Y. Dai, S. Li and H. L. W. Chan, "Ferroelectric, piezoelectric and leakage current properties of (K0.48Na0.48Li0.04)(Nb0.775Ta0.225)O3 thin films grown by pulsed laser deposition", Applied Physics Letter, 98, 022902 (2011)
- D. Y. Wang, N. Y. Chan, S. Li, S. H. Choy, H. Y. Tian and H. L. W. Chan, "Enhanced ferroelectric and piezoelectric properties in doped lead-free (Bi0.5Na0.5)0.94Ba0.06TiO3 thin films", Applied Physics Letter, 97, 212901 (2010)
- D. Y. Wang, S. Li, H. L. W. Chan and C. L. Choy, "Optical and electro-optic anisotropy of epitaxial Ba0.7Sr0.3TiO3 thin films", Applied Physics Letter, 96, 061905 (2010)
- D. Y. Wang, D. M. Lin, K. S. Wong, K. W. Kwok, J. Y. Dai and H. L. W. Chan, "Piezoresponse and ferroelectric properties of lead-free [Bi0.5(Na0.7K0.3Li0.1)0.5]TiO3 thin films by pulsed laser deposition", Applied Physics Letters, 92, 222909 (2008)
- K. L. Jim, D. Y. Wang, C. W. Leung, C. L. Choy and H. L. W. Chan, "One-demensional tunable ferroelectric photonic crystals based on Ba0.7Sr0.3TiO3/MgO multilayer thin films", Journal of Applied Physics, 103, 083107 (2008)



Associate Professor

Runyu Yang

Professional Experience

Associate Professor, School of Materials Science & Engineering, UNSW, 2012 -

Senior Lecturer, School of Materials Science & Engineering, UNSW, 2008 - 2011

Lecturer, School of Materials Science & Engineering, UNSW, 2006 - 2008

ARC-CSIRO Postdoctoral Fellow, School of Materials Science & Engineering, UNSW, 2003-2006

Teaching Contribution

Courses taught including Material Balance and Heat Transfer, Heat, Fluid and Mass Flow, Modelling in Material Engineering, Pollution Control in Materials Processing and Engineering in Process Metallurgy.

Selected Publications

- Jayasundara CT, Yang RY, Guo BY, Yu AB, Mainza A, van der Westhuizen A, Rubenstein J (2011). CFD-DEM modelling of particle flow in IsaMills – Comparison between simulations and PEPT measurements, Mineral Engineering, 24, 1181-817.
- Adi S, Adi H, Chan H-K, Finlay WH, Tong ZB, Yang RY, Yu AB (2011). Agglomerate strength and dispersion of pharmaceutical powders. J. Aerosol Sci, 42, 285-294.
- Liu PY, Yang RY, Yu AB (2011). Dynamics of wet particles in rotating drums: Effect of liquid surface tension. Physics of Fluids, 23, 013304.
- An XZ, Yang RY, Dong KJ, Yu AB (2011). DEM study of crystallization of monosized spheres under mechanical vibrations. Computer Physics Communications, 182, 1989-1994.

Awards & Memberships

Member of American Association of Aerosol Research

Session chairs ECI Particulate Process in Pharmaceutical Industry III 2011

Secretary of organising committee of the ECI Conference on Particulate Processes in the Pharmaceutical Industry III in Gold Coast 2011

Research Contribution

A/Prof. Yang has been working in the area of particle/powder science and technology in the past 12 years. His primary research interest lies in particle technology, aiming to understand the behaviour of particles through rigorous modelling and simulation at microscopic and macroscopic levels. The knowledge is then applied to solving problems in various industrial applications. To achieve this, his work has been focusing on developing multi-scale models, facilitated by advanced particle characterisation, to simulate particles at different time and length scales. His many research areas include particle packing and compaction, particle flow/agglomeration in drums, breakage of agglomerates in fluid flow, multi-scale modelling of grinding processes and development of advanced numerical techniques.

A/Prof. Yang has published over 70 high quality papers, including 46 journal papers and over 30 conference papers. Many of these papers were published in the internationally leading journals with high impact factors, including Physical Review Letters/E, J. Applied Physics, J. Colloid and Interface Science, AIChE J. Etc. These publications have generated total citations more than 700 with h-index of 13. Since 2006, he has secured more than $2m research fund from Australia governments, university and industries, including 7 ARC Discovery and Linkage projects. He is currently leading an active group consisting 4 PhD and 2 Master students.

Emeritus Professor

David Young

Professional Experience

Visiting Scientist, Forschungszentrum, Juelich, Germany, 2008, 2010, 2011, 2012

Visiting Scientist, Dechema, Frankfurt, Germany, 2009

Visiting Professor, Hokkaido University, Sapporo, Japan, 2007

Distinguished Visiting Professor, INPT-CIRIMAT, Toulouse, 2006

Distinguished Visiting Scientist, Oak Ridge National Laboratory, 2005

Head of School, School of Materials Science & Engineering, UNSW 1989-2003

Lecturer, Senior Lecturer, Associate Professor, School of Chemical Engineering & Industrial Chemistry, UNSW 1989-1988

Visiting Professor, Istituto dei Materiali, Universita di Genova, 1986-1987

Visiting Professor, Institute for Materials Research, Mcmaster University, 1983

Research Officer, Central Research Laboratories, BHP Steel, 1977-1978

Research Officer, Applied Chemistry, National Research Council of Canada, 1975-1977

Research Fellow, Materials Science & Engineering, McMaster University, 1971-1975

Post-doctoral Fellow, Chemistry, University of Toronto, 1969-1971

Awards & Memberships

2010 Fellow, Electrochemical Society

2008 U.R. Evans Award (Institute Corrosion Science & Technology, UK)

2008 High Temperature Materials Outstanding Achievement Award (Electrochemical Society, USA)

2003 Corrosion Medal (Australasian Corrosion Association)

1995 FRACI

1993 FTSE

1990 FIMMA, FIEAust

Teaching Contributions

Retired from teaching. During period as Head of School, revised all undergraduate programs and established the BSc (Nanotechnology) degree.

Research Contribution

Most significant contributions are in the field of high temperature alloy-gas interactions. Particular emphasis is placed on the diffusion and phase transformation processes which support these reactions. Current work includes fundamental studies of metal dusting reactions and of water vapour effects on oxidation. The work has led to two books, 6 patents and about 200 international journal papers. It has been recognised by election as chair of a Gordon Research Conference, appointment to ARC Advisory Panel, Engineering and Environmental Sciences (2001-2003), appointed to Board, CRC for Coal in Sustainable Development, and membership of editorial boards: Oxidation of Metals, J. Corrosion Science & Technology, J. Phase Equilibrium, Materials Science Forum, continuous funding from peer reviewed competitive grant schemes since 1979. Total of 50 PhD and Masters students graduated, including 13 since 2000. Recent publication of a book "High temperature oxidation and corrosion" (Elsevier, Amsterdam, 2008) provides a summary and review of much of the research on high temperature materials carried out in the School over the past two decades.

Selected Publications

- J.S. Kirkaldy and D.J. Young, "Diffusion in the Condensed State", Institute of Metals, London (1987).
- D. J. Young and S. Watson, High Temperature Corrosion in Mixed Gas Environments, Oxid. Met., 44, 239-264 (1995).
- C. Toh, D.J. Young & P.R. Munroe, Metal Dusting of Fe-Cr and Fe-Ni-Cr Alloys, Oxid. Met., 58, 1-22 (2002).
- S. Hayashi, S. Ford, D. J. Young, D. J. Sordelet, M. F. Besser and B. Gleeson, - NiPt(Al) and phase equilibria of Ni-Pt-Al at 1150°C, Acta Mater., 53, 3319-28 (2005).
- D.J. Young, High Temperature Oxidation and Corrosion of Metals, Elsevier, Amsterdam (2008).

Senior Lecturer and QEII Fellow

Jiabao Yi

Professional Experience

Senior Lecturer & QE II Fellow, School of Materials Science and Engineering, UNSW, 2011- present

Lee Kuan Yew Postdoctoral Fellow, School of Materials Science and Engineering, National University of Singapore, Singapore, 2008-2011

Research Fellow, Department of Materials Science and Engineering, National University of Singapore, Singapore, 2007-2008

Research Engineer, Department of Mechanical Engineering, 2005-2006

Research Contribution

Most significant contributions are in the field of diluted magnetic semiconductors based on oxide semiconductors, magnetic materials, nonstructural, oxide electronics, spintronics materials. Recognition of this includes: 80+ papers in international journals; 1200+ citations, career h-index 18, $1M research funding since 2011.

Awards & Memberships

2011, QEII Fellowship

2011 - MRS, Singapore

2009, Guest editor of Functional Materials Letters

Guest Reviewer (review committee member) of Journal of Advances in Materials Physics and Chemistry, 2011-

Expert Reviewer Committee Member of International symposium on Chemical Engineering and Materials Properties, Shengyang, China, 2011.

Teaching Contribution

Course taught is Physical Properties of Materials.

Selected Publications

- T.S. Herng, M.F. Wong, D.C. Qi, J.B. Yi, A, Kumar, A. Huang, F.C. Kartawidjaja, S. Smadici, P. Abbamonte, C. Sanchez-Hanke, S. Shannigrahi, J.M. Xue, J. Wang, Y.P. Feng, A. Rusydi, K.Y. Zeng, J. Ding, "Mutual Ferromagnetic-Ferroelectric Coupling in Multiferroic Copper-Doped ZnO" Advanced Materials, 23, 1635 (2011).
- Ariando, X. Wang, G. Baskaran, Z.Q. Liu, J. Huijben, J.B. Yi, A. Annadi, A. Roy Barman, A. Rusydi, S. Dhar, Y.P. Feng, J. Ding, H. Hilgenkamp, T. Venkatesan, "Evidence for Electronic Phase Separation at the LaAlO3/SrTiO3 Interfaces" Nature Communications, 2, 1192 (2011).
- T.S. Herng, D.-C. Qi, T. Berlijn, J.B. Yi, K.S. Yang, Y. Dai, Y.P. Feng, I. Santoso, C. H. Sanchez, X.Y. Gao, A.T.S. Wee, W. Ku, J. Ding, and A. Rusydi, "Room temperature ferromagnetism of Cu-doped ZnO films probed by soft X-ray magnetic circular dichroism", Physical Review Letters , 105, 207201 (2010).
- J.B. Yi, C.C. Lim, Y.P. Feng, J. Ding, G.Z. Xing, H.M. Fan, L.H. Van, S.L. Huang, K.S. Yang, X.L. Huang, X.B. Qin, B.Y. Wang, T. Wu, L. Wang, H.T. Zhang, X.Y. Gao, T. Liu, and A.T.S. Wee, "Ferromagnetism in Diluted Magnetic Semiconductors through Defect Engineering: Li-doped ZnO" Physical Review Letters 104, 137201(2010).
- J.B. Yi, H. Pan, J.Y. Lin, J. Ding, Y.P. Feng, S. Thongmee, T. Liu, H. Gong, and L. Wang, "Ferromagnetism ZnO Nanowires Derived from Electrodeposition on AAO Template and Subsequently Oxidation" Advanced Materials 20, 1170 (2008).

Scientia Professer and Federation fellow

Aibing Yu

Professional Experience

Federation Fellow, Australian Research Council, 2008-2013
Deputy Director, ARC Centre of Excellence for Functional Nanomaterials, 2008-2010
Scientia Professor, UNSW, 2007-
Australian Professorial Fellow, Australian Research Council, 2005-2008
Professor, School of Mat. Sci. & Eng., UNSW, 2001-
Inaugural Director, Centre for Computer Simulation and Modelling of Particulate Systems, UNSW, 2000-2007
Lecturer (92-95), Senior Lecturer (95-97) and Associate Professor (98-01), School of Mat. Sci. & Eng., UNSW, 1998-2001
Research Fellow, University of Wollongong, 1991-1992
Postdoctoral Fellow, Division of Mineral & Process Engineering, CSIRO,1990-1991

Awards & Memberships

2011 Top 100 Most Influential Engineers in Australia
2011 Distinguished Visiting Fellow award, The Royal Academy of Engineering (UK)
2011 Fellow, Australian Academy of Science
2010 NSW Scientist of the Year (in the category of Engineering, Mathematics and Computer Sciences), NSW State Government
2010 ExxonMobile Award, Australian and New Zealand Federation of Chemical Engineers
2010 Ian Wark Medal and Lecture, Australian Academy of Science
2008 ARC Federation Fellowship Award (08-13)
2007 Doctor of Science (DSc), University of New South Wales
2006 Scientia Professor, University of New South Wales (07-12)
2005 ARC Australian Professorial Fellowship Award (05-09)
2004 Fellow, Australian Academy of Technological Sciences and Engineering
2003 Outstanding Overseas Chinese Scholar Award, China
2002 Josef Kapitan Ironmaking Award, Iron and Steel Society
1993 ARC Queen Elizabeth II Fellowship Award (93-97)
1990 CSIRO Postdoctoral Fellowship Award (90-91)

Research Contribution

Aibing Yu specialized in process metallurgy, obtaining BEng in 1982 and MEng in 1985 from Northeastern University, PhD in 1990 from University of Wollongong (UoW), and DSc in 2007 from the University of New South Wales (UNSW). He has been with UNSW School of Materials Science and Engineering since June 1992. He is currently Scientia Professor and ARC Federation Fellow, directing a world-class research facility "Lab for Simulation and Modelling of Particulate Systems (SIMPAS)".

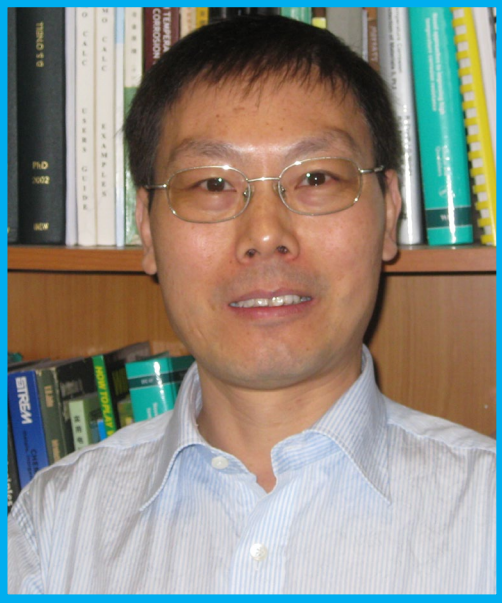
He is a world-leading scientist in particle/powder technology and process engineering, which is very much related to the mineral/metallurgical/chemical/material industries. He has made many significant contributions and is recognised as an authority in particle packing, particulate and multiphase processing, and simulation and modelling. He has authored >650 publications (including >365 collected in the Web of Science), and delivered many invited plenary/keynote presentations at various international conferences. He has attracted >$25M external research funds (>40 ARC grants) to UNSW, graduated >50 research students (>40 PhD). He has served on the editorial board of >10 learned journals including Industrial & Engineering Chemistry Research, Powder Technology, Granular Matter, and ISIJ International. He is a recipient of a number of prestigious awards/fellowships as given left.

Selected Publications

Please see the website for details: http://www.materials.unsw.edu.au/staff/aibing-yu

Senior Lecturer

Jianqiang Zhang



Professional Experience

Senior Lecturer, UNSW, 2012-
Senior Research Fellow, UNSW, 2009-2011
Research Fellow, Research Associate, UNSW, 2003-2009
Research Scientist, Max-Planck Institute for Iron Research, Germany, 2000-2003
Visiting Research Fellow, University of Newcaste, 1996
Associate Professor, Lecturer, Southeast University, China, 1987-1996

Awards & Memberships

Australian Research Fellowship (ARF) 2006-2010
Max-Planck-Society Fellowship 2002
Vice President & Treasurer for Australasian Corrosion Association, NSW Branch

Teaching Contribution

Thermomechanical Processing
Physical Metallurgy of Alloys

Research Contribution

Most significant contributions are in the field of gas-solid reactions at high temperature, including high temperature corrosion and processing metallurgy. Research emphases are on the reaction thermodynamics and kinetics, phase transformation and characterisation, reaction mechanism understanding, sustainable materials processing, and new materials development. The work has led to 65 international journal papers (including book chapters) and more than 27 conference papers. Total research funding exceeds $1.4 m, mainly from ARC.

Selected Publications

- J. Zhang, P. Munroe, D.J. Young, "Microprocesses in nickel accompanying metal dusting", Acta Materialia, 56 (2008) pp 68-77.
- J. Zhang, D.J. Young, "Coking and Dusting of Fe-Ni Alloys in CO-H2-H2O Gas Mixtures", Oxidation of Metals, 70 (2008) pp 189-211.
- J. Zhang, D.J. Young, "Kinetics and Mechanisms of nickel metal dusting I. Kinetics and morphology", Corrosion Science, 49 (2007) pp1496-1512.
- J. Zhang, D.J. Young, "Effect of copper on metal dusting of austenitic stainless steels", Corrosion Science, 49 (2007) pp 1450-1467.
- J. Zhang, D. M. I. Cole, D. J. Young, "Alloying with Copper to Reduce Metal Dusting of Nickel", Materials and Corrosion, 56 (2005) 756-764.
- J. Zhang, A. Schneider, G. Inden, "Characterisation of the Coke Formed during Metal Dusting of Iron in CO-H2-H2O Gas Mixtures", Corrosion Science, Vol. 45, No. 6 (2003) pp 1329-1341.
- J. Zhang, A. Schneider, G. Inden, "Effect of Gas Composition on Cementite Decomposition and Coke Formation on Iron", Corrosion Science, Vol. 45, No. 2 (2003) pp 281-299.
- J. Zhang, O. Ostrovski, "Iron Ore Reduction/Cementation: Experimental Results and Kinetic Modelling", Ironmaking and Steelmaking, Vol. 29, No.1 (2002) pp 15-21.

Lecturer

Zongyan Zhou

Professional Experience

Lecturer, School of Materials Science & Engineering, UNSW, 2011

ARC Postdoctoral Fellow Industry, School of Materials Science & Engineering, UNSW, 2007-2010

Research Associate, School of Materials Science & Engineering, UNSW, 2007

Research Contribution

Dr. Zhou's working area is in particle/powder science and technology. He has developed an extensive expertise is in the numerical modelling of multiphase flow, heat transfer and granular dynamics, and their applications to different processes. He has made a number of significant contributions to this area, mainly including:

- Contribute two-part comprehensive review papers on DEM/CFD-DEM theories and their applications. Then, he published another paper in Journal of Fluid Mechanics and represents a comprehensive assessment of model formulation, implementation and related issues in the CFD-DEM approach, fully establishing this particle scale approach for general application.
- Extend CFD-DEM to study heat transfer in fluid bed reactors. Dr. Zhou fully established this model (AIChE Journal), and then further application for the heat transfer between fluidized beds and a horizontal tube (AIChE Journal).
- Develop DEM model for non-spherical particles. Such a development enables us to identify how the particle shape affects the packing structure and particle flow and heat transfer behavior (Chem. Eng. Sci. and I&ECR).
- CFD-DEM modelling of process metallurgy, e.g. multiphase flow and thermal behaviour related to an ironmaking blast furnace, aiming to provide better understanding of the process control.

Selected Publications

- Z.Y. Zhou, D. Pinson, R.P. Zou, and A.B. Yu, Discrete particle simulation of gas fluidization of ellipsoidal particles, Chemical Engineering Science 66 (2011), 6128-6145.
- Z.Y. Zhou, R.P. Zou, D. Pinson and A.B. Yu, Dynamic simulation of the packing of ellipsoidal particles, Industrial & Engineering Chemistry Research 50 (2011) 9787-9798.
- Z.Y. Zhou, H.P. Zhu, A.B. Yu and P. Zulli, Numerical investigation of the transient multiphase flow in an ironmaking blast furnace, ISIJ International 50 (2010) 515-523.
- Z.Y. Zhou, S.B. Kuang, K.W. Chu and A.B. Yu, Discrete particle simulation of particle-fluid flow: Model formulations and their applicability, Journal of Fluid Mechanics 661 (2010) 482-510.
- Z.Y. Zhou, A.B. Yu and P. Zulli, Particle Scale Study of Heat Transfer in Packed and Bubbling Fluidized Beds, AIChE Journal 55 (2009) 868-884.
- Z.Y. Zhou, H.P. Zhu, A.B. Yu, B. Wright and P. Zulli, Discrete particle simulation of gas-solid flow in a blast furnace, Computers & Chemical Engineering 32 (2008) 1760-1772.
- H.P. Zhu, Z.Y. Zhou, R.Y. Yang and A.B. Yu, Discrete particle simulation of particulate systems: A review of major applications and findings, Chemical Engineering Science 63 (2008) 5728-5770.
- H.P. Zhu, Z.Y. Zhou, R.Y. Yang and A.B. Yu, Discrete particle simulation of particulate systems: Theoretical developments, Chemical Engineering Science 62 (2007) 3378-3396.

Technical Staff

Rohana Chandratilleke

PROFESSIONAL OFFICER

Reporting to Prof. Aibing Yu directly, Rohana is involved with various editorial tasks associated with publishing of journal papers. He is also responsible for some administrative activities such as maintaining the group website. Rohana also engages in some research activities related to granular mixing.

Soo Woon Chong

TECHNICAL OFFICER

Laboratory Manager supporting the academic staff and researchers and postgraduate students working in the Nanotechnology & Electrochemical Lab, Nanoparticle synthesis Lab, Flow characterisation Lab. Ceramic Lab and Bio-Char Lab

Jane Gao

SENIOR ITC SUPPORT OFFICER

Responsible for running the IT team in the School and ensuring it is accountable in areas such as research, teaching, operation and marketing. Provides life cycle management of School IT assets, including eight network printers and hundreds of desktop and notebook computers for staff, students and laboratories with different hardware and software configurations.Holding responsibility for day to day IT operations including managing the computer teaching lab and maintaining the shared file system to the School. Manages IT team workload and prioritize overall IT requests raised by staff and students to achieve timely and effective results. Provides printing, mailing list and booking services, as well as online media service to the School. Filling IT service gaps between service providers and local users in the School and helping users to achieve efficiency. Provides solutions in design, delivery, implementation and operational support for IT projects in the School. Proactively monitoring School IT services and network connectivity, attending to and resolving issues promptly. Coordinates with UNSW and Faculty IT for resources allocation, licensing, SOE packaging, network installation, security and other policies.

Thwin Htoo

TECHNICAL SUPPORT

Oversees and support research in the multi user facilities located in the Red Centre basement Lab (RCB), School of Materials Science and Engineering which comprises a range of advanced materials & thin film deposition and characterization facilities, also responsible for the overall management of the RCB. Resource contact for Pulse-Laser Deposition systems, provide user training on Differential Scanning Calorimeter, Dilatometer and Laser Flash for Thermal Analysis lab. (B008)(B010) Magnetron Sputtering, (B013) Optical analysis, (B015) Thermal diffusivity analysis/Laser Flash, (B016) Thermal analysis, (B020) Thin Films and interface characterisation.

William Joe

RESEARCH SUPPORT ENGINEER

Bill Joe is a Research Support Engineer responsible for managing and providing high level technical support for the School's research and teaching activities, particularly but not exclusively, in the area of characterisation of mechanical and nanomechanical properties of materials. His duties involves development and management of laboratories and equipment, training of undergraduate and postgraduate students, researchers and demonstrators and providing direction in experimental design. He is responsible for the facilities which are spread over several laboratories and these include: 4 screw-driven and 2 servo-hydraulic tensile testing machines; laser and mechanical extensometers; strain measuring equipment; equipment for testing from -80 to 1600°C; 2 in situ loading stages for optical and scanning electron microscopes; 2 nanoindenters with heating stages, dynamic loading and nanoscratch capability; a high-load instrumented indenter; mechanical resonance measuring equipment for stiffness determination; high-temperature and room-temperature tribometers; scratch tester and surface profilometer. All equipment is computer controlled. Bill is currently the Laboratory Manager for PG08 (mechanical testing); PG10 (fatigue testing); RBC-B003 (nanomechanics testing); RBC-B005 (tribology testing) and RBC-B007 (piezoelectric property characterisation).

Rahmat Kartono

TECHNICAL OFFICER

Specialises in laboratory experimental and design for solid-gas and liquid-gas reaction with a broad spectrum of materials/processes: metals and alloys, corrosion damage mechanism, cathodic protection principles, and high temperature coatings. Establishes experimental research from conception to implementation mostly in designing and producing metallurgical test work for high temperature applications under controlled atmosphere. Responsible for managing high temperature laboratories and furnaces as well as provide safe use training for high temperature experiments including casting, experiments involving pressurized gases and high temperature processes.

Danny Kim

ITC SUPPORT OFFICER

Supports undergraduate and postgraduate students in their computing requirements. Performs daily tasks of a computer administrator including setting up their newly purchased computers with standard software applications, network and printers connection, maintaining their user accounts, troubleshooting computer hardware and software problems. Assists in managing the computer teaching lab and maintaining the shared file system to the School. Assisting in computer purchases for staff and students.

NM Saha Chaudhury

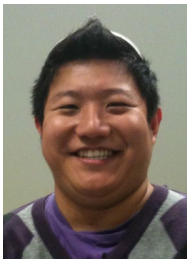
RESEARCH ENGINEER

Manager of the Sustainable Materials Research & Technology Centre, Saha is chartered professional engineer and has more than 30 years of experience in engineering innovation specifically related to research work. He is Manager of SMaRT Centre, his role includes managing SMaRT Centre finance, staff and student recruitment, research projects, and liaising with Industry partner laboratory OHS. He is involved in research areas of waste polymers utilization in the steelmaking industry, and innovative iron and steelmaking technologies. He brings to the team the essential qualities of professionalism, diligence, originality in thought and ideas, excellent creativity and a friendly positive attitude. He has also designed highly specialized equipment for conducting cutting edge experimental research, which has been critical in realizing successful research endeavours. His work has helped to create a world class research facility which has been recognized by academics, PhD students and industry partners. His contribution to the Centre was also clearly evident in ground breaking research into the use of waste polymers in the steelmaking industry. Saha has jointly published journal and conference papers and has won jointly with others several awards.

George Yang

TECHNICAL OFFICER

Operation and maintenance of metallography laboratory, undergraduate teaching laboratory, materials processing laboratory, and workshop/design laboratory. Support for honours student, postgraduate, staff, and industry research; teaching; other technical staff; and school special events. Management of all aspects of laboratory safety and hazardous materials.



Anthony Zhang

SAFETY OFFICER

Main role is School Safety Officer to provide overall OHS advice, information and direction. Duties include identification and management of risks and hazards in laboratories, offices, and other areas in the School; liaison and consultation in OHS at School, Faculty, and University levels; implementation of UNSW OHS policies, procedures and documents as applicable to the School; monitoring our schools compliance with UNSW OHS and current legislation; reporting and investigating incidents, injures, accidents and providing corrective action strategies; promotion of OHS awareness and a safe work culture. Laboratory manager responsibilities include polymer laboratory and some analytical equipment in the Red Centre Basement.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Administrative Staff

Courtenay Atwell
Undergraduate Administrator

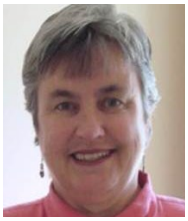
Courtenay looks after undergraduate and postgraduate coursework students. She is the editor of the School Annual Report and organises various events.

Uttra Benton
Industry Relations Officer

Uttra provides assistance to Professor Veena Sahajwalla and the SMaRT group. She assists with Industry liaison along with coordinating travel and organising various events.

Christina Chung
Executive Assistant to Head of School

Christina provides executive assistance to the Faculty of Science and Head of School, supporting a diverse range of activities and interactions with a broad range of stakeholders.



Rosalind Haskew
Marketing Officer

Rosalind looks after the School's Undergraduate Student Recruitment, she is also our High School liaison officer, scholarships coordinator and editor of the Materials Newsletter.

Maria Farrugia
Administrative Assistant

Maria provides assistance to Professor Aibing Yu and the entire SIMPAS group. This includes coordinating travel, room bookings and organising events

Judy Lim
Purchasing Officer

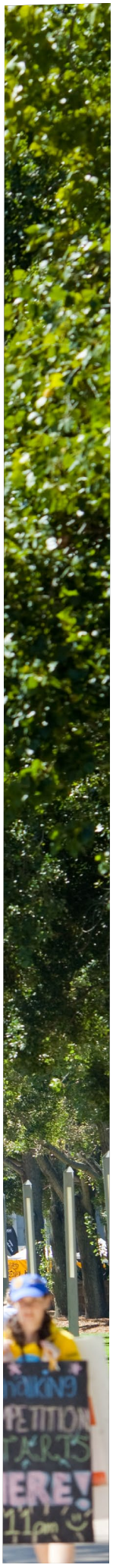
Judy manages purchasing in the School including laboratory equipment and supplies and office consumables. She also updates the School Asset Registries and completes laboratory and car recoups.

Lana Strizhevsky
Postgraduate Administrator

Lana looks after all postgraduate research students in the School. She also processes expense reimbursements and makes travel bookings.

Lucy Zhang
School Manager

Lucy leads and manages the operations of the School including financial planning and management, policy planning, communications and marketing, student administration and information management.



Staff Activities

School Committees

School Advisory Committee
Mark Hoffman (Chair)
Lucy Zhang
John Dnaiels
Jiabao Yi
Anthony Zhang

Marketing Committee
Sammy Chan (Chair)
Veena Sahajwalla
Alan Crosky
Ros Haskew
Nagarajan Valanoor
Runyu Yang

Saftey Committee
Owen Standard (Chair)
Anthony Zhang
Mark Hoffman
Ruiping Zou
Rahmat Kartono

School Research Committee
Nagarajan Valanoor (Chair)
Aibing Yu
Chris Sorrell
Paul Munroe
Veena Sahajwalla

Scholarships Committee
Veena Sahajwalla (Chair)
Owen Standard
Alan Crosky
Ros Haskew

Space Committee
Michael Ferry (Chair)
Bill Joe
Lucy Zhang

Learning and Teaching Committee
Alan Crosky (Chair)
Paul Munroe
Owen Standard
Sammy Chan
Runyu Yang
Jane Gao

* Head of School holds an ex-officio position on all School Committees and attends when appropriate.

Roles on External Bodies

Sri Bandyopadhyay

International organising committee of APM-2011 (International Conference on Advances in Polymer Materials), held at Chennai by CIPET India),

Organised the 3 day India – Australia Workshop on Nanotechnology at Jadavpur University India during 29 – 31 December 2011 with Prof Siddhartha Mukherjee of J.U.

Member, American Chemical Society

Member, Society of Plastics Engineers, USA

Sammy Chan

Interviewer for Chartered Engineers and Chartered Scientists, UK

Professional Interviewer for Institute of Materials, Minerals and Mining

International reader for ARC

External Examiner for PhD theses for Universities of Queensland and Wollongong

Alan Crosky

Faculty of Science Education Committee

John Daniels

Chair of the Beamline Scoping Group for the Advanced Diffraction and Scattering beamline proposal for the Australian Synchrotron

Member of the Program Advisory Committee for the Powder Diffraction beamline of the Australian Synchrotron

Michael Ferry

Member - ARC Centre of Excellence (Design in Light Metals) Executive Committee

Member - ARC Centre of Excellence (Design in Light Metals) Research Management Committee

Member – International Advisory Group for Australian Microscopy & Microanalysis Research Facility (AMMRF)

New South Wales Branch Councillor of Institute of Materials Engineering, Australia

Member, International Committee of the International Conference series on Recrystallization and Grain Growth

Member, Organizing Committee of the 5th International Conference on Recrystallization and Grain Growth (2013), Sydney, Australia

Sean Li

Member of Instrument Advisory Team for Time of Flight Polarization Analysis Spectrometer, Bragg Institute, ANSTO

Vice President of Thin File Society

Chair of 5th International Conference on Electroceramics

Mark Hoffman

International Congress on Fracture, Board Member

Australian Fracture Group, Committee Member

Materials Australia, Education Committee Chair

Intersect E-services Committee, Member

Member, Germany Centre of Excellence Programme in Engineering Sciences Assessment Panel

ARC Centre of Excellence in Design in Light Metals, Research Program Leader and Research Committee Member

Paul Munroe

Australian Research Council – OzReader
Business Events Sydney – Ambassador
Australian Microscopy and Microscopy Research Facility - Technical Committee (Chair)
Australian Microscopy and Microscopy Research Facility - IT Committee
Australian Microscopy and Microscopy Research Facility - Operations Group Committee
Committee to host IMC-19 in 2018 (Co-chair)

Veena Sahajwalla

Fellow of the Institution of Engineers Australia (since 2005).
Member of the ARC Engineering, Mathematics and Informatics Committee College of Experts (2011 – 2013)

Nagarajan Valanoor

Symposium Organizer, "Multiferroics and Magnetoelectrics: Theory & Experiments", International Symposium on Integrated Functionalities, San Juan 2010
Symposium Organizer, "Domain Engineering in Ferroic Systems", International Materials Research Congress, Cancun 2010

Danyang Wang

Australian Research Council – OzReader
Research Program evaluator for National Council for Research and Development, Romania

David Young

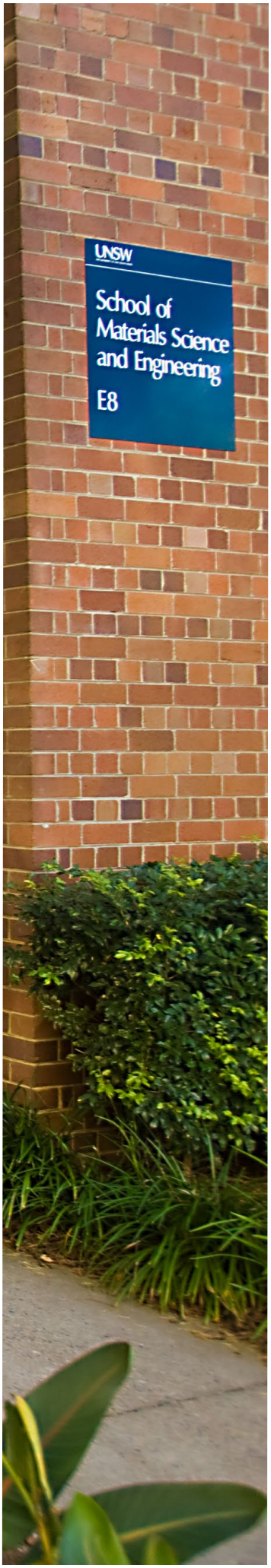
Member – Advisory Board, ARC Centre of Excellence for Design in Light Metals
Member – Tedchnical Advisory Committee, Baosteel-Australia Research and Development Centre

Aibing Yu

Committee Member, Association pour l'Etude de la Micromécanique des Milieux Granu (AEMMG)
Member, Advisory Board and University Priority Centre – Advanced Particle Processing, University of Newcastle
Member, Overseas Expert Advisory Board – Science and Technology, Chinese State Government
Chair of Technical Advisory Committee, Baosteel – Australian Joint Research & Development Centre
Honorary President, Governing Board, Federation of Chinese Scholars in Australia (FOCSA)
Panel Member, International Science Linkages (ISL) Program, Department of Innovation, Industry, Science and Research (DIISR, Australia)
Panel Member, Endeavour Awards Selection Panel, Department of Education, Employment & Workplace Relations, Australia
Expert Group Member – Chemical Sciences, Research Workforce Strategy, Department of Education, Employment & Workplace Relations, Australia
Member, Overseas Expert Advisory Board – Science and Technology, Chinese Government
Conference Chair, 3rd International Engineering Foundation Conference on Particulate Processes in Pharmaceutical Industry, July, Gold Coast, Australia

Jianqiang Zhang

Vice president & treasurer of Australasian Corrosion Association, NSW Branch



Staff Editorial Activities

Sri Bandyopadhyay

Editor in Chief, International Journal of Energy Engineering
Structural Health Monitoring – an international journal, Sage
International Journal of Plastics Technology, Springer
Journal of Advanced in Microscopy Research, American Scientific Publishers

Sammy Chan

Co-editor, Materials Chemistry and Physics

Michael Ferry

Board of Review, Metallurgical and Materials Transactions A
ARC OZ Reader of Discovery/Linkage Grant applications
Reviewer, ANSTO neutron diffraction & Australian Synchrotron beam-line grant applications

Sean Li

Guest Editor for Journal of Electronic Materials
Guest Editor for Key Engineering Materials

Mark Hoffman

Associate Editor of Journal of the American Ceramic Society
Editorial Board, Functional Materials Letters
Editorial Board, Key Engineering Materials

Paul Munroe

Associate Editor, Materials Characterization
Editorial Board, Microscopy Research and Technique
Editorial Board, Research Letters in Materials Science
Editorial Board, Journal of Materials Sciences and Engineering
Editorial Board, Advances in Materials Science

Oleg Ostrovski

Editorial Board, High Temperature Materials and Processes
Editorial Board, Electrometallurgy

Veena Sahajwalla

Board of Review, Metallurgical and Materials Transactions B (Process Metallurgy and Materials Processing Science), USA

Chris Sorrell

Editor, Research Letters in Materials Science
Editor, Advances in Materials Science and Engineering
Editor, Iranian Journal of Materials Science and Engineering
Editor, Journal of Electronic Science and Technology (International)
Editor, Korean Journal of Materials Research
Editor, Journal of Modern Transportation
Editor, Korean Journal of Materials Research

Owen Standard

Editor, Journal of the Australian Ceramic Society

Nagarajan Valanoor

[Associate Editor, Transactions of the IEEE Ultrasonics Ferroelectrics Frequency Control Society

Principal Editor, MRS Communications

Danyang Wang

Co-Editor of special issue in Key Engineering Materials for Electroceramics

David Young

Editorial Board, Corrosion and Materials
Editorial Board, J Corrosion Science & Technology
Editorial Board, J Phase Equilibrium
Editorial Board, Oxidation of Metals
Editorial Board, Materials Science Forum

Jiabao Yi

Guest Reviewer (review committee member) of Journal of Advances in Materials Physics and Chemistry,

Expert Reviewer Committee Member of International symposium on Chemical Engineering and Materials Properties, Shengyang, China, 2011

Aibing Yu

Associate Editor, Chinese Science Bulletin, Springer (ISSN: 1001-6538)

Member of Editorial Board and Thematic Editor (2009-), Particuology, Elsevier (ISSN: 1672-2515)

Member of Editorial Board, Science in China – B: Chemistry, Springer (ISSN: 1006-9291)

Member of Editorial Board, 4 journals published by Bentham Science Publisher: Recent Patents on Engineering (ISSN: 1872-2121), Recent Patents on Nanotechnology (ISSN: 1872-2105), Recent Patents on Chemical Engineering (ISSN: 1874-4788), and Recent Patents on Materials Science (ISSN: 1874-4648)

Member of Editorial Board, Powder Technology, Elsevier (ISSN: 0032-5910)

Member of Editorial Board, International Journal of Engineering Systems Modelling and Simulation (IJESMS), Interscience Publishers (ISSN: 1755-9758)

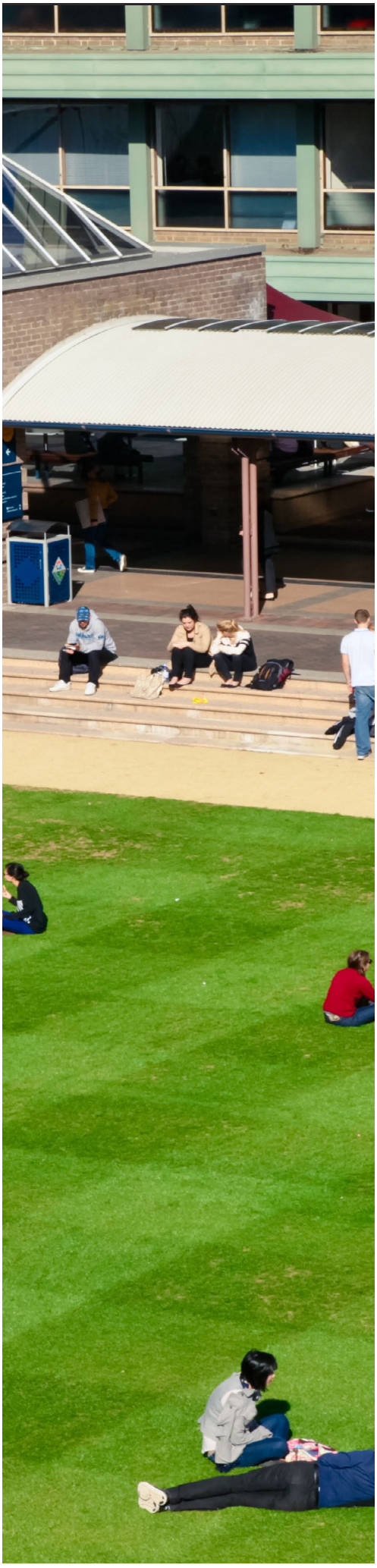
Member of Editorial Board, Granular Matter, Springer (ISSN: 1434-5021)

Member of Editorial Advisory Board, Industrial & Engineering Chemistry Research, American Chemical Society Publications, (ISSN: 0888-5885)

Member of Advisory Board, ISIJ International, The Iron and Steel Institute of Japan (ISSN: 0915-1559)

Guest editor, special issue for selected papers from Australia-China-Japan joint symposium on iron and steel making, Steel Research International, Wiley InterScience (ISSN: 1611-3683)

Guest editor, special issue on multiscale modeling and simulation of complex particulate systems, Particuology, Elsevier (ISSN: 1672-2515).



External Committees

Sammy Chan
Faculty International Strategies Committee

Alan Crosky
Member Mock Interview Team, Promotion to Professor, UNSW

Michael Ferry
Member Solid State Advisory Group, UNSW Analytical Centre
Member EMU Advisory Group, UNSW Analytical Centre
Faculty of Engineering, 2011 IEAust Accreditation Committee
Member Project Planning Group, New Materials Science Building, UNSW
Chair, School Space Committee

Sean Li
American Ceramic Sociey

Mark Hoffman
Chair of Education Committee and Member of National Council, Institute of Materials Engineers Australia
Honorary Secretary of NSW Branch of the Australian Ceramic Society
Board Member on the International Fracture Congress
Member, Intersect E-Services and Technology Committee

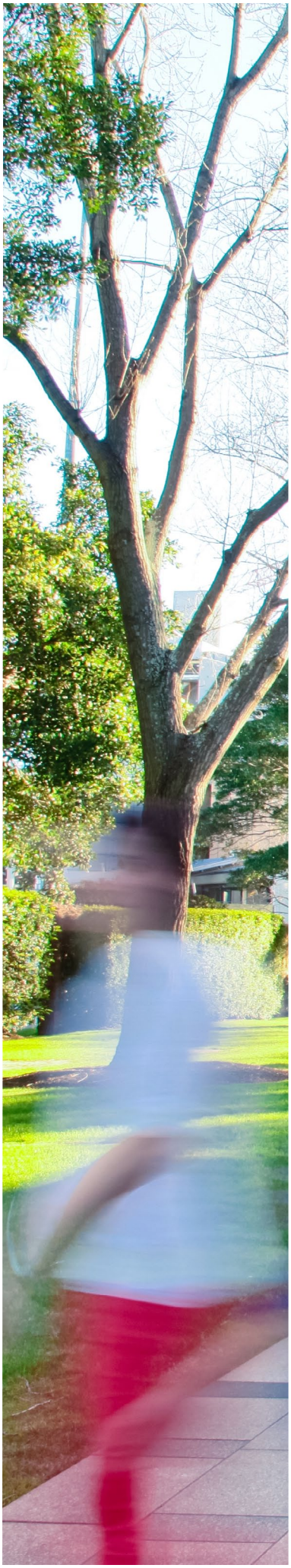
Owen Standard
Faculty of Engineering Promotions Committee: Associate Lecturer to Lecturer
Faculty of Science Promotions Committee: Lecturer to Senior Lecturer

Nagarajan Valanoor
Postgraduate Students Society
Director, Talented Students Program, Faculty of Science.

Runyu Yang
Member of American Association of Aerosol Research
Organising committee of the ECI Conference on Particulate Processes in the Pharmaceutical Industry III in Gold Coast 2011
Session chair, ECI Particulate Process in Pharmaceutical Industry III 2011

Jiabao Yi
Australian Research Council - assessor


Lift
Toilets



Presentations to External Bodies and Conferences

Sri Bandyopadhyay

•Plenary paper presented at the ICONE International Nanoengineering Conf organised by IEEE India in Jan 2011

•Plenary paper presentation at IAWNT, J.U. during 29 – 31 December 2011

Sammy Chan

•"XRD Anisotropic Broadening of Nano-crystallites", Advances in X-ray Analysis, Volume 54, Proceedings of the 2010 Denver X-ray Conference

• "Metal hydride hydrogen storage", Renewable Energy Workshop, RMIT University, February 2011, Melbourne, Australia

•N. F. Hayazi, Y. Wang and S. L. I. Chan, 2011: "Rietveld Analysis on in-situ thermal dehydrogenation of Titanium Hydride Powder", Powder Processing, Consolidation and Metallurgy of Titanium Conference, December, 2011, Brisbane, Australia

Alan Crosky

Conferences

•Mechanical Behaviour of Kenaf Fibre Polyolefin Matrix Composites, 19th International Conference on Processing and Fabrication of Advanced Materials, PFAMXIX, Auckland, January 2011 (invited keynote)

•Sustainable furniture panel products from forrestry by-products in Australia, eddBE2011, Brisbane, February 2011

•Mechanical Behaviour of Kenaf Fibre Polyolefin Matrix Composites, Sustainability Symposium, Sustainable Materials, Processes & Technologies: Future pathways for reducing greenhouse gas impacts of materials, UNSW, Sydney, July 2011

•Materials for Sustainable Panels: Comparing different matrices and fillers from food and forestry industry by products, Sustainability Symposium, Sustainable Materials, Processes & Technologies: Future pathways for reducing greenhouse gas impacts of materials, UNSW, Sydney, July 2011

•Physical properties of panels from macademia shells, 18th International Conference on Composite Materials, Korea, August 2011

•Grading of biofibres for use in natural fibre composites, 20th International Conference on Processing and Fabrication of Advanced Materials, PFAMXX, Hong Kong, December 2011 (invited keynote)

Other Presentations

•Science/Medicine assessment session, Assessing a content-rich large-class foundation course, UNSW, June 2011

•Online learning, Yuyan Ze University Faculty Development Program, UNSW August 2011

Workshops

•Facilitator, Large class teaching workshop, Foundations in Undergraduate Learning and Teaching, UNSW, February 2011

•Facilitator, Large class teaching workshop, Foundations in Undergraduate Learning and Teaching, UNSW, June 2011

•Facilitator, Large class teaching workshop, Foundations in Undergraduate Learning and Teaching, UNSW, November 2011

John Daniels

•"Applications of high-energy synchrotron x-ray scattering and the future Advanced Diffraction and Scattering beamline of the AS", Australian Synchrotron User Meeting, Melbourne, December (2011)

•"Domain Dynamics in Bulk Electro-Ceramic Materials", New Developments in Time-Resolved Studies with Synchrotron Radiation, Grenoble, France, 7th – 9th February (2011)

•"Neutron and x-ray scattering studies of actuation mechanicals in electro-mechanical materials", International Conference on Electroceramics, Sydney, December (2011)

Michael Ferry

•"Applications of 3D-EBSD in the study of textures of materials" 16th International Conference on Textures of Materials, Keynote, 11 December 2011, Mumbai, India.

•"Thermomechanical processing of a multifunctional titanium alloy" Powder Processing, Consolidation and Metallurgy of Titanium (PM Titanium 2011), Keynote, 6 December 2011, Brisbane, Australia.

•"Direct strip casting of steels" Baosteel-Australia Joint R&D Centre Meeting, 7 November 2011, BaoSteel, Shanghai, China.

•"Bulk metallic glass research within Project A4" ARC Centre of Excellence for Design in Light Metals Annual Workshop, 28 November, 2011, Melbourne, Australia.

•"Accelerated Metallurgy within the ARC Centre of Excellence for Design in Light Metals" Accelerated Metallurgy Kick-Off Meeting, 21 June 2011, ESA-ESTEC, Noordwijk, Netherlands.

•"3D-EBSD in Materials Science" Engineering Materials Institute Workshop on Advanced Techniques for Materials Characterization, Keynote, 9 June, 2011, University of Wollongong.

•"Direct strip casting of metals and alloys" Baosteel-Australia Joint R&D Centre Meeting, 14 April 2011, UNSW.

•"Research on light amorphous alloys at UNSW" European Space Agency Meeting, 3 March 2011, San Diego, USA.

•"Light amorphous alloys – Science and applications" Department of Materials Engineering, National University of Singapore, 10 February 2011, Singapore.

•"Bulk metallic glasses" IISc-UNSW-UQ Bangalore Workshop, 7 February, 2011, Bangalore, India.

Mark Hoffman

•7-9 February 2011, IISc-UNSW-UQ Workshop, Bangalore, India, "Deformation of Thin Films"

•14 April 2011, BaoSteel Group meeting, UNSW, Australia "Low-Density Structures"

•29 June 2011, European Meeting on Ferroelectrics (EMF) 2011, Bordeaux, France, "Bipolar and Unipolar Fatigue of Ferroelecric BNT-Based Lead Free Piezoceramics"

•7 October 2011, CIPET-UNSW Presentation, UNSW, Australia, "Polymer Research in Nanocomposites"

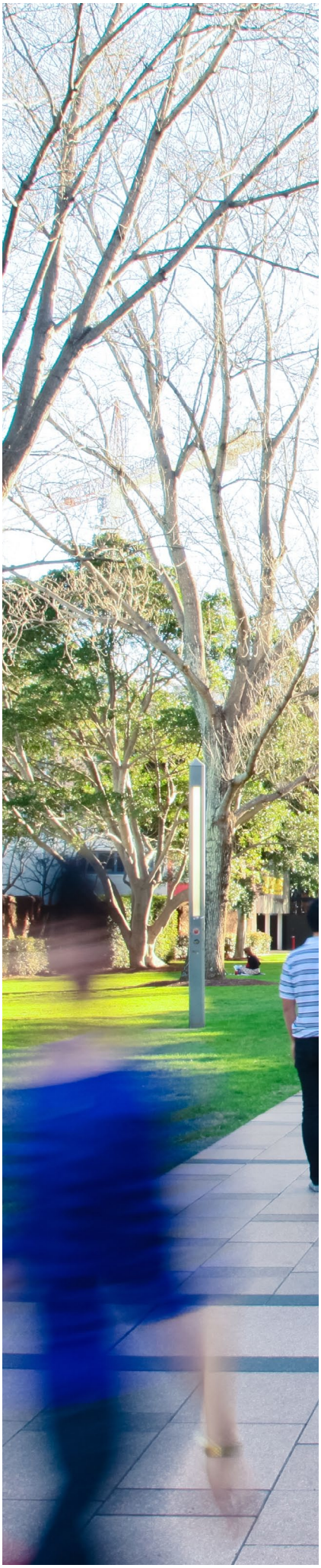
•2 November 2011, International Net-shape Manufacturing Conference 2011, Melbourne, Australia, "Genetic Algorithms for Design of Low Density Structures"

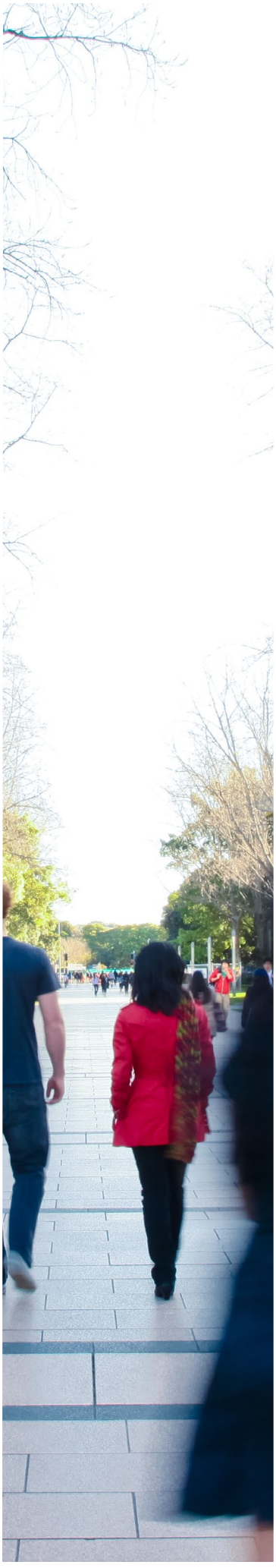
•14 November 2011, Superconductivity Research Center, Western Jiatong University, Chengdu, China, "Nanomechanics of Biological Structures"

•18 November 2011, BaoSteel Research Centre, China, "Design of Low Density Components in Autobodies"

•22 November 2011, 3rd Australia-China Symposium for Materials Science, Gold Coast, Australia, "Fatigue of Piezoelectric Ceramics"

•14 December 2011, International Conference on Electroceramics (ICF) 2011, Sydney, Australia, "Fatigue of Ferroelecric BNT-Based Lead Free Piezoceramics"





Sean Li

•"Development of High Performance Ceramic Based Thermoelectric Materials at UNSW", Nanyang Technological University, Singapore, July 2011.

•"Research of High Performance Thermoelectric Materials at UNSW", Deakin University, Australia, November 2011.

Invited Talks in International Conferences:

•"Formation of Nanoporous ZnO Microcheerios", Electronic Materials and Applications 2011, Orlando 19th – 21st January 2011.

•"Enhancement of magnetic properties in rare earth and cobalt codoped ZnO thin films for spintronic applications", 38th International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, United States, 23rd – 28th January 2011.

•"Oxygen Dependence of Thermoelectric Properties and Lattice Dynamics in Na0.73CoO2-", Electronic Materials and Applications 2011, Orlando 19th – 21st January 2011.

•"Advanced Multifunctional & Energy Materials Research at UNSW", 2nd International forum on green energy & electronic materials, and their applications, Wollongong, Australia, 28-29th March 2011.

•"Hydrogenation of Graphene in the Presence of Electric Field", the 4th IEEE International NanoElectronics Conference, Tao-Yuan, Taiwan, 21st – 24th June, 2011

Paul Munroe

•"Microstructural characterization using focused ion beam microscopy", Invited Seminar, School of Engineering, University of Waikato, Hamilton, NZ, May, 2011.

•"Advanced Microscopic Characterisation through Integrated Learning Tools", Microscopy and Microanalysis 2011, Nashville, Tennessee, USA, August 2011

•"The Focused Ion Beam Hard Mask Mechanism" ", Microscopy and Microanalysis 2011, Nashville, Tennessee, USA, August 2011

•"Water Extractable Organic Carbon in Fresh and Treated Biochars", Asia Pacific Biochar Meeting, Kyoto, Japan, September, 2011.

•"Interfacial analysis of a bismuth ferrite lanthanum aluminate heterostructure", MRS Fall Meeting, Boston, USA, November 2011

Oleg Ostrovski

•"An Alternative Technology for Ilmenite Processing" and "Chlorination of Reduced Ilmenite Concentrates and Synthetic Rutile", The 12th World Congress on Titanium, Beijing, 19-24 June 2011.

•"Characterisation and Carbothermal Reduction of a Murray Basin Ilmenite Concentrate", Heavy Minerals Conference, Perth, 5-6 October 2012

•"A new technology for production of titanium tetrachloride", EuroMat2011, Montpellier, France, 11-15 September 2011.

Veena Sahajwalla

• ASTE, China Australia Symposium, Recycling hard waste and liquids, November 2011
• The Big Night of Science, August, 2011
• ASTE Academy Night with School Students, July, 2011
• IITAA Business Seminar June, 2011
• "Commercialising technologies from a university's perspective", Melbourne, March 2011
• Judge Panel Member Robogals Science Challenge, November 2011
• Judge Panel Member, The Australian Innovation Challenge , November 2011
• Multicultural NSW Government Business Summit, October 2011
• Panel member, Workshop, Building Partnerships with Industry - Science and Engineering, UNSW, October 2011
• Judge Panel Member, Google Science Fair, July 2011
• Invited speaker, Carbon pricing / Tax Forum, Hon Member Peter Garrett, July 2011
• ABC New Inventors program, panel 2011

Charles Sorrell

•"Optimising your Chances of Being Published. Part 1: Before Submission", Postdoctoral Academy Program, UNSW, Sydney, 2011

•"Carbon Capture and Solar Sequestration", NSW Branch Meeting, Australian Institute of Energy, Sydney, 2011

•"Reaction Bonded Silicon Nitride Intervertebral Spacers: Results of 10 Year Clinical Study", Materials Research Society Fall Meeting, Boston, USA, 2011

Owen Standard

•"Heavy Clay Technology", 3-day Professional Education Course, Dundas VIC. December 2011

Danyang Wang

•"Growth and electrical properties of doped lead-free (Bi0.5Na0.5) TiO3-BaTiO3 ferroelectric thin films with morphotropic phase boundary composition", International Conference on Materials for Advanced Technologies (ICMAT 2011), Singapore, June, 2011.

•"Recent Progress on Bismuth based Lead-free Ferroelectric/Piezoelectric Thin Films", Department of Applied Physics, The Hong Kong Polytechnic University, August, 2011 (Invited Seminar).

•"Multiferroic Properties of (La, Mn) Co-substituted BiFeO3 Thin Films", The 7th International Conference on Novel Materials and their Synthesis (NMS-VII), Shanghai, October, 2011. (Invited)

Runyu Yang

•Advanced Computational Particle Technology, Zhejiang University, China, Jan 2011

•DEM investigation of the transverse mixing of wet particles in a rotating drum, 5th International Granulation Workshop, Lausanne, Switzerland, June 2011

•Numerical study of the effects of moisture and electrostatic charge on the agglomerate aerosolisation, ECI Conference on Particulate Processes in the Pharmaceutical Industry III, Gold Coast, Australia, July 2011

David Young

•High Temperature Carburisation of Fe-Cr in Low Carbon Activity Gases, Invited paper, Gordon Research Conference on High Temperature Corrosion, New London, NH, USA.

•Designing Alloys for High Temperature Service, ATiMetals, Charlotte, NC, USA

•Diffusion in Internal Oxidation Reactions, DIMAT, Dijon, France

•Corrosion of Alloys in Oxy-Fuel Gases, International Corrosion Congress, Perth, Australia

•Performance of Fe-Ni-Cr base Alloys in Oxy-Fuel Gases, TMS, San Diego, CA, USA

•Metal Dusting of F-Ni-Cu Model Alloys, Electrochemical Society Fall Conference, Boston, MA, USA

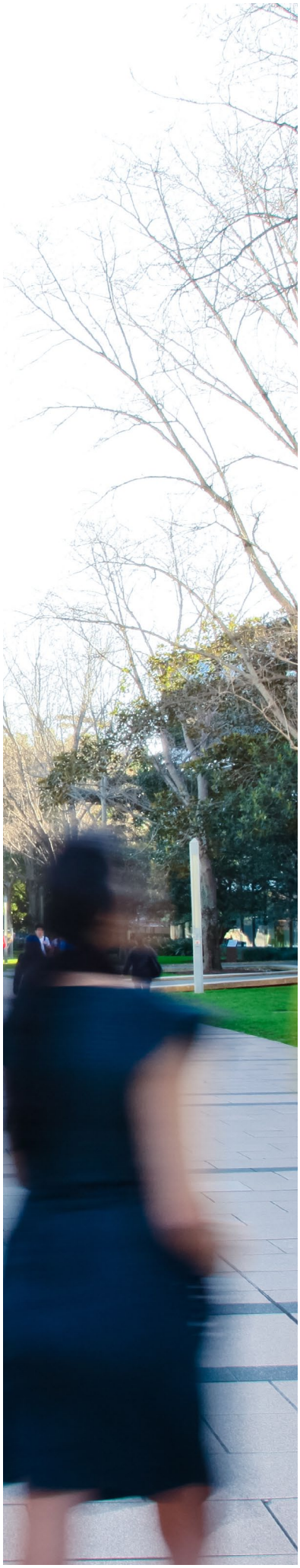
Jiabao Yi

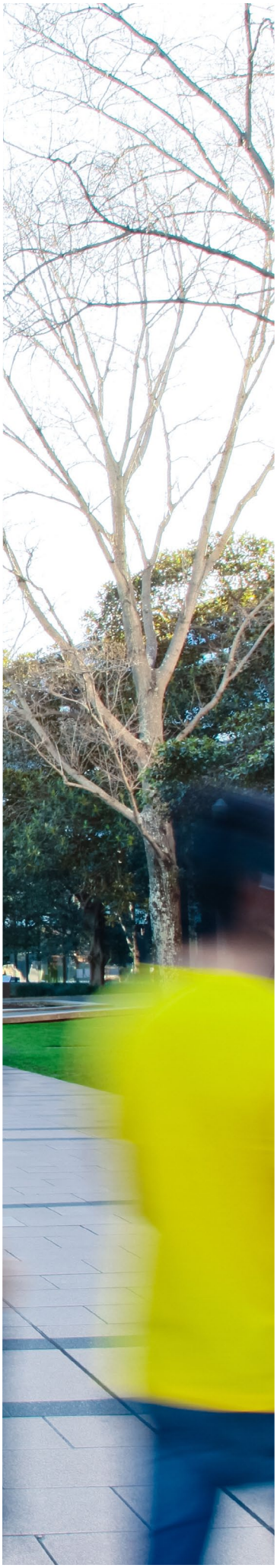
•"Unusual ferromagnetism in the research of oxide magnetic semiconductors", International Conference on Electroceramics, Dec, 2011, Sydney, Australia (invited).

•"Ferromagnetism in Li doped ZnO-defects engineering", the 3rd Australia-China Symposium for Materials Science (ACSMS), Nov. 2011, Gold Coast, Australia.

•"Unusual ferromagnetism in the research of oxide magnetic semiconductors", Helmholtz-Zentrum Dresden-Rossendorf, Germany, June, 2011 (Invited).

•"Nonmagnetic element doped oxide magnetic semiconductors", International Conference on Materials and Advanced Technologies (ICMAT), Singapore, Jun, 2011.





Aibing Yu

•"The use of Large Diameter Dense Medium Cyclones", Coal Processing Optimisation Conference, March, 2011, Brisbane, Australia (Workshop Lecture)

•"Particle scale modeling of multiphase flow in cyclones", 3rd International Conference on Particulate Processes in the Pharmaceutical Industry, July 2011, Gold Coast, Australia (Keynote Lecture)

•"Coupled problems in the simulation and modeling of particulate systems", UK-China Joint Symposium on Particle Technology, July 2011, Birmingham, UK (Keynote presentation)

•"Discrete particle simulation of particulate systems", PARDEM Summer School, September 2011, University of Edinburgh, Edinburgh, Scotland (Invited Lecture)

•"Research Innovation: A Comparative Analysis of the Chinese and Western Systems", Education and Research Training Forum, Wuhan University of Technology, April 2011, (Guest lecture)

•"Multiscale particle research", 3rd Global Chinese Chemical Engineers Workshop – Frontier in Chemical Engineering, July 2011, Tsinghua University, Beijing, China (Keynote presentation)

•"Self-assembly of nanoparticles: some thoughts and comments", 3RD Australia-China Symposium for Materials Science, November 2011, Gold Coast, Australia (Keynote presentation)

•"Effect of grinding media size distribution on wet grinding", International Conference on Computational Modelling, June 2011, Falmouth, UK (conference presentation)

•"Particle scale modeling of the multiphase flow in dense medium cyclones", 3rd International Engineering Foundation Conference on Particulate Processes in Pharmaceutical Industry, July 2011, Gold Coast, Australia (Keynote presentation)

•"Numerical simulation of the particle flow and sieving behaviour on the sieve bend/low head screen combination", International Conference on Physical Separation, June 2011, Falmouth, UK (conference presentation)

•"Modelling the multiphase flow in an ironmaking blast furnace", Chemeca, September 2011, Sydney, Australia (Keynote presentation)

Jianqiang Zhang

•"Water vapour effect on cyclic oxidation of Fe-Cr alloys at 950°C", Proceedings of the 18th International Corrosion Congress, Paper No 262 (2011).

•"The transition from internal to protective oxidation during oxidation of dilute Fe-Al alloys in Ar-20% CO2", Proceedings of the 18th International Corrosion Congress, Paper No 277 (2011).

•"High temperature corrosion of chromia-forming alloys under oxyfuel firing conditions", Proceedings of the 18th International Corrosion Congress, Paper No 313 (2011).

•"On the metal dusting corrosion of alloy 800 ferrules in a petrochemical environment", Proceedings of the 18th International Corrosion Congress, Paper No 440 (2011).

•"Metal dusting research at UNSW", presented on 28 July 2011 at the State Key Lab for Corrosion and Protection, Institute of Metal Research (IMR), Chinese Academy of Sciences, China.

Zongyan Zhou

•"Particle scale simulation of axial effective thermal conductivities in packed beds", Particulate Processes in the Pharmaceutical Industry III, July 24-29, 2011 Gold Coast, Australia

•"Particle scale simulation of heat transfer behaviour in gas fluidization with ellipsoidal particles", Particulate Processes in the Pharmaceutical Industry III, July 24-29, 2011 Gold Coast, Australia

•"Piling and hopper flow of ellipsoidal particles – A comparison with spheres", Chemeca 2011, September 18-21, Sydney, Australia

•"Application of discrete element method to ironmaking process", Baosteel Research Laboratory, Nov. 18, Shanghai, China

Awards

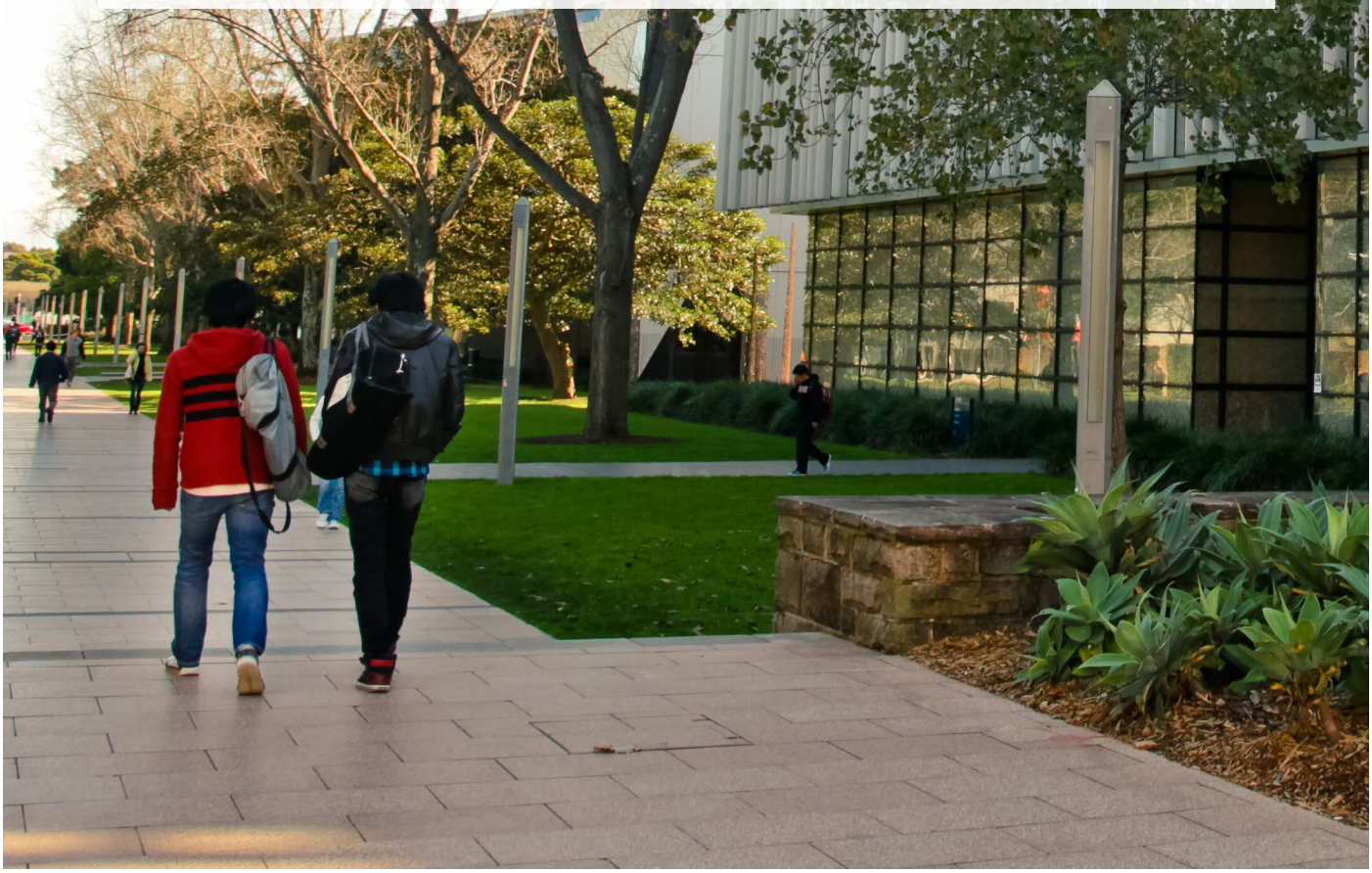
The School's students, alumni and staff achievements have been well recognised by a wide range from professional and community groups. Some of these include the following.

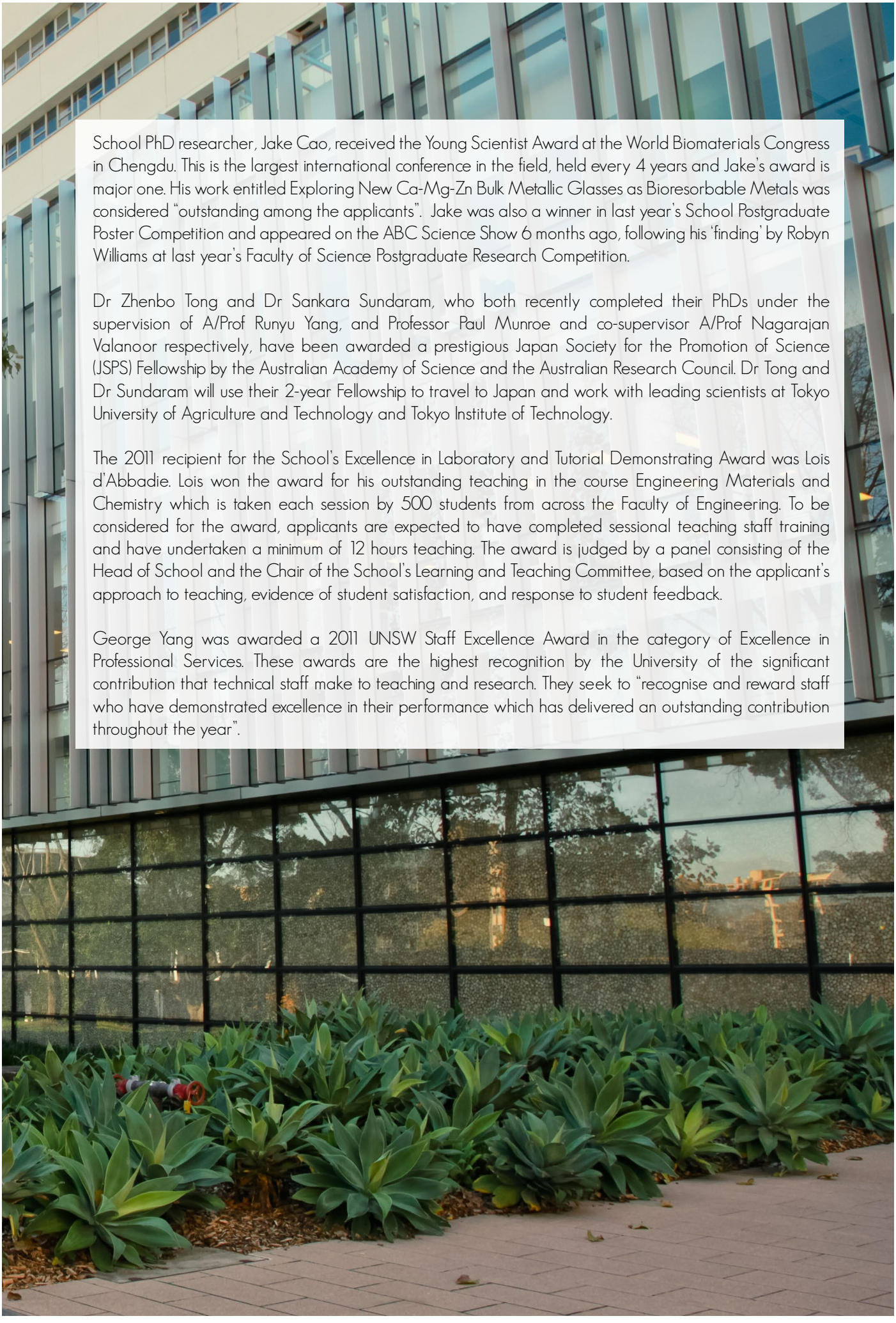
Alumnus and Chairman of Wesfarmers, Boral and Redkite, Dr Bob Every, was appointed an Officer of the Order of Australia in January 2012 for distinguished service to business. Dr Every was recognised for his many achievements, including being an advocate for corporate social responsibility as well as a contributor to charitable organisations and support of the University.

Staff and students also received a number of awards. Most notable was Professor Aibing Yu's election as a Fellow of the Australian Academy of Science; a rare award provided to only a small number of scientists each year. This is an exceptional achievement within the Australian scientific community recognising a career that has significantly advanced, and continues to advance, the world's scientific knowledge.

Professor Veena Sahajwalla was appointed as a Commissioner to the Australian Government's Climate Commission earlier in 2012. The role of the Commission is to provide reliable and independent information regarding the science of climate change, international actions and the economics of a carbon price. This appointment is an impressive recognition of Veena and her activities in the field.

Veena and her group of researchers through the Centre for Sustainable Materials Research and Technology (SMaRT) collaborated with manufacturing giant Arrium Mining and Materials (formerly OneSteel Ltd) to develop breakthrough technology to recycle plastic and rubber waste in the scrap reprocessing furnace. This technology not only produces lower emissions and requires less electricity but also reduces the reliance on coke, which is normally used in EAF steel-making, and has the potential to transform steel production globally. The innovation has attracted science and technology awards in the United States and Australia such as the Nokia Business Innovation Award for the 2011 Telstra NSW Business Women's Awards, the 2012 CRC Collaborative Innovation Award and the NewSouth Innovation's 2012 UNSW Innovation Awards.





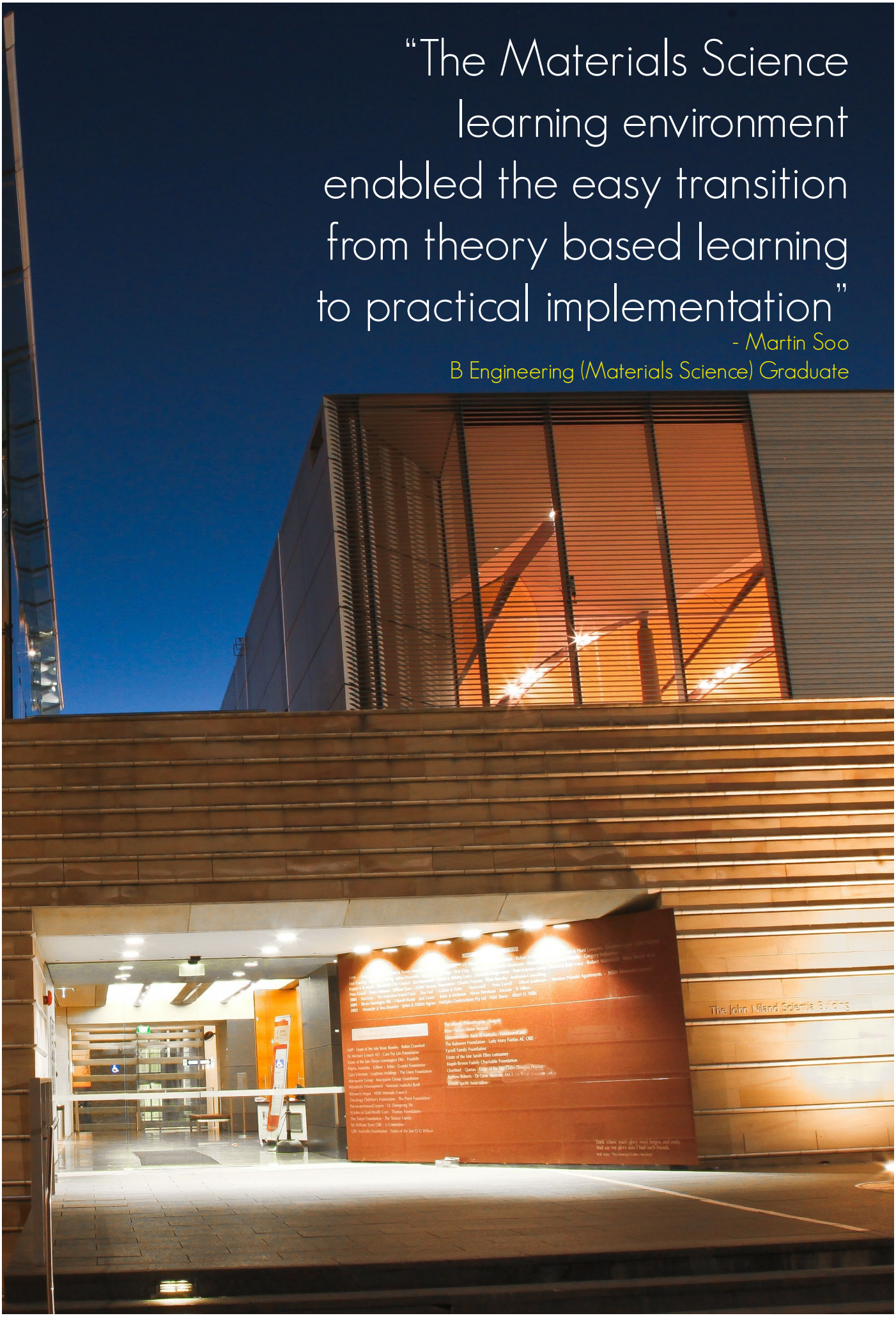
School PhD researcher, Jake Cao, received the Young Scientist Award at the World Biomaterials Congress in Chengdu. This is the largest international conference in the field, held every 4 years and Jake's award is major one. His work entitled Exploring New Ca-Mg-Zn Bulk Metallic Glasses as Bioresorbable Metals was considered "outstanding among the applicants". Jake was also a winner in last year's School Postgraduate Poster Competition and appeared on the ABC Science Show 6 months ago, following his 'finding' by Robyn Williams at last year's Faculty of Science Postgraduate Research Competition.

Dr Zhenbo Tong and Dr Sankara Sundaram, who both recently completed their PhDs under the supervision of A/Prof Runyu Yang, and Professor Paul Munroe and co-supervisor A/Prof Nagarajan Valanoor respectively, have been awarded a prestigious Japan Society for the Promotion of Science (JSPS) Fellowship by the Australian Academy of Science and the Australian Research Council. Dr Tong and Dr Sundaram will use their 2-year Fellowship to travel to Japan and work with leading scientists at Tokyo University of Agriculture and Technology and Tokyo Institute of Technology.

The 2011 recipient for the School's Excellence in Laboratory and Tutorial Demonstrating Award was Lois d'Abbadie. Lois won the award for his outstanding teaching in the course Engineering Materials and Chemistry which is taken each session by 500 students from across the Faculty of Engineering. To be considered for the award, applicants are expected to have completed sessional teaching staff training and have undertaken a minimum of 12 hours teaching. The award is judged by a panel consisting of the Head of School and the Chair of the School's Learning and Teaching Committee, based on the applicant's approach to teaching, evidence of student satisfaction, and response to student feedback.

George Yang was awarded a 2011 UNSW Staff Excellence Award in the category of Excellence in Professional Services. These awards are the highest recognition by the University of the significant contribution that technical staff make to teaching and research. They seek to "recognise and reward staff who have demonstrated excellence in their performance which has delivered an outstanding contribution throughout the year".

The Undergraduate Experience



"The Materials Science learning environment enabled the easy transition from theory based learning to practical implementation"

- Martin Soo

B Engineering (Materials Science) Graduate

The Learning and Teaching Report

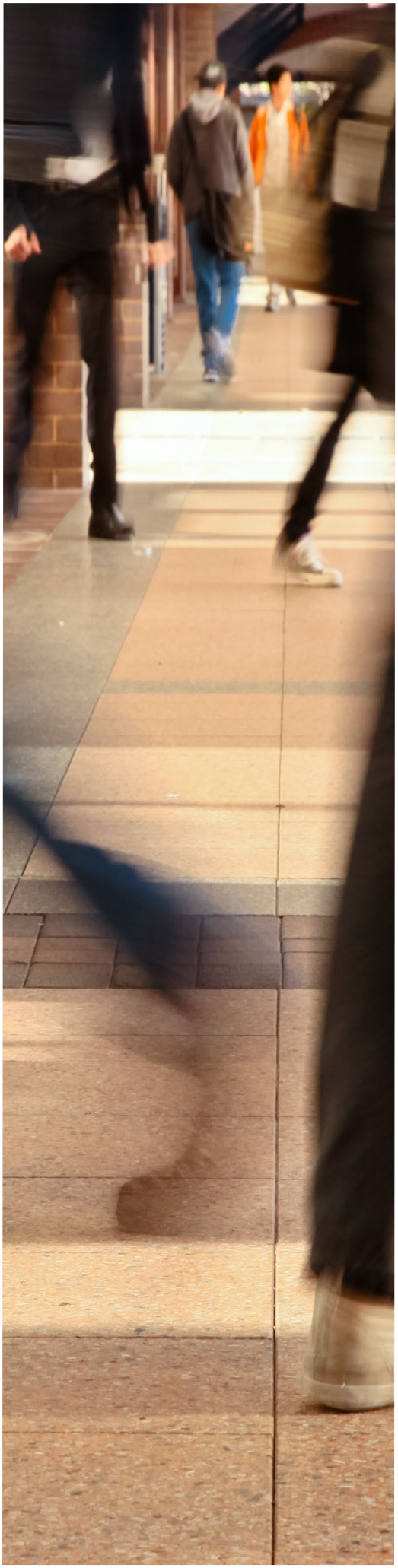
2011 saw the introduction of our new undergraduate programs. The first year of our program is part of the common first year engineering program which operates across the University and was therefore left unchanged. The new program is being introduced progressively, with the second year rolled out in 2011.

The University undertook a review of assessment procedures in 2010 and 2011 with a view to reducing the assessment workload for both students and staff. This was taken into account when undertaking the program revisions and the new programs are fully compliant with University's new guidelines on assessment. With the simplification in assessment it was possible to improve scheduling of assessment tasks across the program to remove bottlenecks. This was greatly appreciated by our students.

As in past years, we again provided an award for Excellence in Tutoring or Laboratory Demonstrating to sessional staff drawn from our postgraduate research students. The 2011 recipient was Lois d'Abbadie who teaches the casting and rolling laboratory in our large first year foundation materials engineering course taken by approximately 800 students across the Faculty of Engineering. Applicants are expected to have completed sessional teaching staff training and must have undertaken a minimum of 12 hours teaching. The award is judged by a panel consisting of the Head of School and the Chair of the School's Learning and Teaching Committee, based on the applicant's approach to teaching, evidence of student satisfaction, and response to student feedback. While there can only be one winner, student feedback indicates that the quality of teaching provided by our sessional staff is consistently high.

Alan Crosky
Chair, School Learning and Teaching Committee


UNSW
UNSW



Undergraduate

The main objective of our undergraduate program is to produce graduates who will be recognised as the best suited and most appropriately trained to contribute to the institutions and industries of Australia. For many years, the demand for graduates has well and truly exceeded the number the School produces. However, a significant recruitment effort is ensuring that there is a pipeline of high quality students who will graduate in the years to come.

Teaching Programs:

The major undergraduate programs taught by the School are:

- Bachelor of Engineering (3135)
- Bachelor of Engineering and Master of Biomedical Engineering combined program (3138)
- Bachelor of Engineering and Bachelor of Commerce combined program (3136)
- Bachelor of Engineering (Materials Science) and Bachelor of Engineering (Chemical Engineering)

2011 Enrolments by Stages:

	Stage 1	Stage 2	Stage 3	Stage 4	Total
BE	43	19	17	14	93
BE/MBiomed	23	16	6	9	54
BE/BComm	7	2	3	0	12
BE(Materials Science)/BE (Chemical Engineering)	1	0	0	0	1
Total	74	37	26	26	160

The BE program (3135) has four study plans in the degree plan – Ceramics Engineering, Materials Engineering, Physical Metallurgy and Process Metallurgy – with students declaring their preference at the end of Stage 2. These study plans give the students the opportunity to specialise in the specific disciplines. This is reflected in the final year enrolment distribution:

2011 BE Final Year Enrolments by Study Plan:

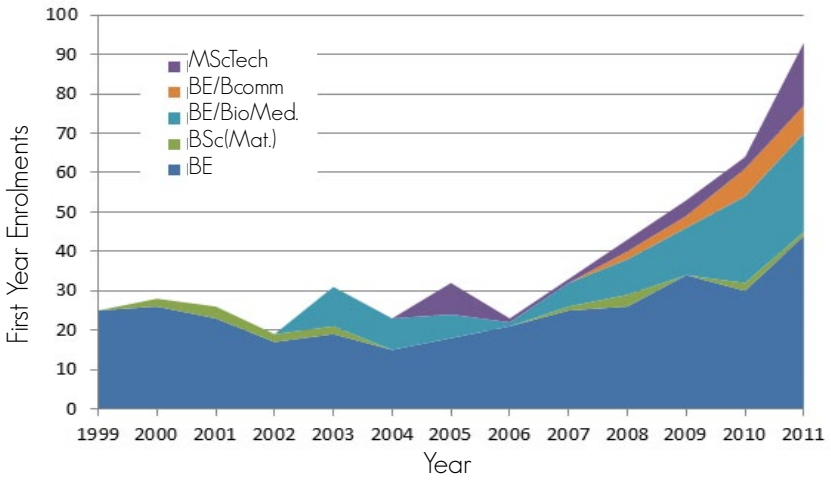
Ceramics Engineering	2
Materials Engineering	8
Physical Metallurgy	7
Process Metallurgy	6
Total	23

The 3167 Nanotechnology program was reviewed in 2010 following a steady decline in student enrolments numbers and quality. From 2011, the program will be managed by the School of Chemistry.

The intake of students since over the past 12 years is shown in the graph below. The number of students enrolling in School programs, particularly the combined BE/MBiomedE and BE/BCom programs has increased steadily. Also shown is enrolment in the coursework masters MScTech program which has grown significantly in previous years.

Studies Report

New Enrolments



Entry into the BE programs is generic and students declare their major at the end of Stage 2. Process Metallurgy and Ceramic Engineering attract only small numbers of students though they are heavily influenced by the availability of scholarships. There is, however, an increasing drive for graduates who can perform strongly in a variety of environments which drives a need for strong generic materials engineering skills which can support workplace learning. The BE(Materials)/MBiomed program continues to attract a steady number of high quality students. In 2011, the School also introdcued a new double degree BE (Materials)/BE(Chemical).

Student quality continued to improve in 2011, with an average ATAR entry of 96.6 compared with 86.3 in 2007. This is driven in large part of a significant investment in scholarships, by both industry and the School, and a strong marketing and recruitment activity in the School. 1st Year retention rates are complex to understand. While approximately 20% of students leave the program between 1st and 2nd year, a similar number of students are attracted to the program. However, the School certainly has the largest undergraduate program in the discipline nationwide by far.

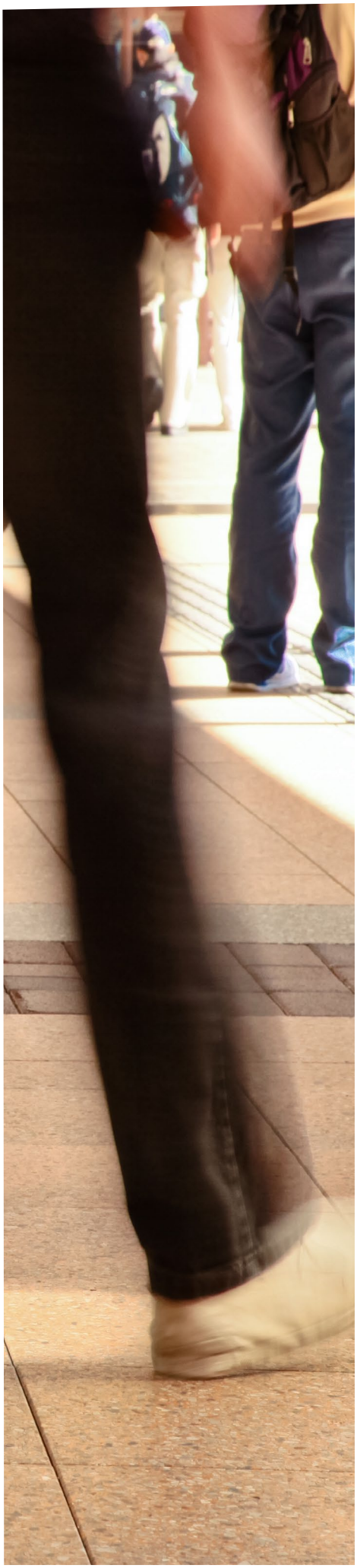
The School's undergraduate teaching load is predominantly to local students. However, there is a steady and consistent increase in international students, particularly into the BE(Materials) and BSc(Nanotechnology) programs.

Undergraduate teaching load includes both students studying towards a degree in Materials and students in other study programs who choose to take materials courses. Approximately, 40% of the the Schools teaching load is external to its own programs.

Undergraduate Teaching Load (EFTSU):

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Local	89.5	105.3	99.72	98.72	101.7	103.2	97.02	109.1	120.96
Intl	14.1	17.4	17.47	20.70	23.95	32.73	37.45	53.54	57.98
Total	**103.6**	**122.7**	**117.3**	**119.4**	**125.6**	**135.9**	**134.5**	**162.6**	**178.9**

Undergraduate teaching load includes both students studying towards a degree in Materials and students in other study programs who choose to take materials courses. Approximately, 40% of the the Schools teaching load is external to its own programs.



B Engineering (Materials)
3135

Stage 1
PHYS1121 Physics 1A (6UOC) or PHYS1131 Higher Physics 1A (6UOC)
MATH1131 Math 1A (6UOC) or MATH1141 Higher Math 1A (6UOC)
MATH1231 Math 1B (6UOC) or MATH1241 Higher Math 1B (6UOC)
ENGG1811 Computing for Engineers (6UOC) or COMP1911 Computing 1 (6UOC)
ENGG1000 Engineering Design (6 UOC)

Plus
Year 1 Electives totallling 18 UoC

* Required elective:
MATS1192 Design & App of Materials (6 UOC)
* Recommended electives:
CVEN1300 or MINE1300 or MMAN1300 (6 UOC)
CHEM1011 or CHEM1031

Stage 2
MATH2019 Engineering Mathematics 2E (6 UOC)
MATS2001 Physical Prop of Materials (6 UOC)
MATS2003 Materials Characterisation (6 UOC)
MATS2004 Mechanical Behaviour of Mats (6 UOC)
MATS2005 Intro Fluid Flow & Heat Trans (6 UOC)
MATS2006 Diffusion and Kinetics (6 UOC)
MATS2007 Sustainable Mats Processing (6 UOC)
MATS2008 Thermodynamics & Phase Equilib (6 UOC)

Stage 3
MATH2089 Numerical Methods & Statistics (6 UOC)
MATS3001 Mechanical Behaviour in Metals (6 UOC)
MATS3002 Fundamentals of Ceramic Proces (6 UOC)
MATS3004 Polymer Sci & Engineering 1 (6 UOC)
MATS3006 Des App of Mats in Sci & Eng 3 (6 UOC)
MATS3007 Materials Industry Management (6 UOC)
Professional Electives 6 UOC
General Education 6 UOC

Stage 4
MATS4009 Materials Engineering Project (9 UOC) - taken in semester 1 and semester 2 for a total of 18 UOC.
And Professional Electives 24 UOC

OR

MATS4010 Materials Engineering Project (12 UOC) - taken in semester 1 and semester 2 for a total of 24 UOC.
And Professional Electives 18 UOC

PLUS
6 (UoC) General Education

"I enjoy the studies here because the courses are interesting with integrated labs and plant trips, which gives an industry feel that you can never really get from books."

Angela Chen
Fourth Year Student

B Engineering(Materials)/Commerce
3136

Stage 1
PHYS1121 Physics 1A (6UOC) or PHYS1131 Higher Physics 1A (6UOC)
MATH1131 Math 1A (6UOC) or MATH1141 Higher Math 1A (6UOC)
MATH1231 Math 1B (6UOC) or MATH1241 Higher Math 1B (6UOC)
ENGG1811 Computing for Engineers (6UOC) or COMP1911 Computing 1 (6UOC)
ENGG1000 Engineering Design (6 UOC)

Plus
Year 1 Electives totallling 18 UoC

* Required elective:
MATS1192 Design & App of Materials (6 UOC)
* Recommended electives:
CVEN1300 or MINE1300 or MMAN1300 (6 UOC)
CHEM1011 or CHEM1031

Supphatuch Ukritnukun
Fourth Year student

"I enjoy the academic-student relationship. Academics doors are always open for the students."

Stage 2
Semester 1
MATH2019 Engineering Mathematics 2E (6 UOC)
MATS2001 Physical Prop of Materials (6 UOC)
MATS2008 Thermodynamics & Phase Equilib (6 UOC)
Plus 6 UOC of Commerce Courses
Semester 2
24 UOC of Commerce Courses

Stage 3
Semester 1
24 UOC of Commerce Courses
Semester 2
MATS2004 Mechanical Behaviour of Mats (6 UOC)
MATS2005 Intro Fluid Flow & Heat Trans (6 UOC)
MATS2006 Diffusion and Kinetics (6 UOC)
MATS2007 Sustainable Mats Processing (6 UOC)

Stage 4
Semester 1
MATH2089 Numerical Methods & Statistics (6 UOC)
MATS2003 Materials Characterisation (6 UOC)
MATS3001 Mechanical Behaviour of Metals (6 UOC)
MATS3002 Fundamentals of Ceramic Proces (6 UOC)
Semester 2
MATS3006 Des App of Mats in Sci & Eng 3 (6 UOC)
MATS3007 Materials Industry Management (6 UOC)
12 UOC Commerce Courses

Stage 5
Semester 1
MATS4009 - Materials Engineering Project (9 UOC)or-
MATS4010 - Materials Engineering Project (12 UOC)^
MATS3004 Polymer Science & Engineering 1 (6 UOC)
Plus 6 UOC Commerce Courses
^NOTE: MATS4009 is an 18 UOC project with 9 UOC taken in semester 1 and 9 UOC taken in semester 2. Whereas MATS4010 is a 24UOC project with 12 UOC taken in semester 1 and 12 UOC taken in semester 2.

Semester 2
MATS4009 - Materials Engineering Project and 12UOC Engineering Professional Electives* (21 UOC)
or
MATS4010 - Materials Engineering Project and 6 UOC Engineering Professional Elective* (18 UOC)
PLUS 6 UOC Commerce

STAGE 6
Semester 1
6 UOC Professional Electives
18 UOC Commerce Courses

B Engineering (Materials)/Chemical 3137

Stage 1

MATH1131 Math 1A (6UOC) or MATH1141 Higher Math 1A (6UOC)
MATH1231 Math 1B (6UOC) or MATH1241 Higher Math 1B (6UOC)
CEIC1001 Engineering Chemistry (6 UOC)
ENGG1000 Engineering Design (6 UOC)
ENGG1811 Computing for Engineers (6 UOC)
MATS1101 Engineering Materials and Chem (6 UOC)
PHYS1121 Physics 1A (6 UOC)
Plus
Year 1 elective 6 (UoC), recommended
MMAN1300 Engineering Mechanics (6 UOC)
Note: Students can take the combination CHEM1011 and CHEM1021 or the combination CHEM1031 and CHEM1041 as a replacement for the combination MATS1101 and CIEC1001

Stage 2

CEIC2000 Material and Energy Systems (6 UOC)
CEIC2001 Fluid and Particle Mechanics (6 UOC)
CEIC2002 Heat and Mass Transfer (6 UOC)
MATH2019 Engineering Mathematics 2E (6 UOC)
MATH2089 Numerical Methods & Statistics (6 UOC)
MATS2001 Physical Prop of Materials (6 UOC)
MATS2004 Mechanical Behaviour of Mats (6 UOC)
MATS2006 Diffusion and Kinetics (6 UOC)

Stage 3

MATS2003 Materials Characterisation (6 UOC)
MATS3001 Mechanical Behaviour of Metals (6 UOC)
MATS3002 Fundamentals of Ceramic Proces (6 UOC)
MATS3004 Polymer Sci & Engineering 1 (6 UOC)
MATS3006 Des App of Mats in Sci & Eng 3 (6 UOC)
MATS3007 Materials Industry Management (6 UOC)
MATS Professional Elective 6 (UOC)
General Education 6 (UOC)

Stage 4

CEIC3000 Process Modelling and Analysis (6 UOC)
CEIC3001 Advanced Thermo & Separation (6 UOC)
CEIC3002 Experimental Practice (6 UOC)
CEIC3003 Chemical Engineering Lab (6 UOC)
CEIC3004 Process Equipment Design (6 UOC)
CEIC3005 Process Plant Design (6 UOC)
CEIC3006 Process Dynamics and Control (6 UOC)
MATS Professional Elective 6 (UOC)

Stage 5

CEIC4000 Environment and Sustainability (6 UOC)
CEIC4001 Process Design Project (12 UOC)
MATS5001 Thesis A (6UOC) or CIEC4002 Thesis A (6UOC)
MATS5002 Thesis B (6UOC) or CIEC4003 Thesis B (6UOC)
MATS5003 Advanced Thesis B (6UOC) or CIECXXXX (6 UOC)
MATS Professional Electives totalling 12 (UOC)

B Engineering(Materials)/M Biomed

3138

Stage 1

PHYS1121 Physics 1A (6UOC) or PHYS1131 Higher Physics 1A (6UOC)
MATH1131 Math 1A (6UOC) or MATH1141 Higher Math 1A (6UOC)
MATH1231 Math 1B (6UOC) or MATH1241 Higher Math 1B (6UOC)
ENGG1811 Computing for Engineers (6UOC) or COMP1911 Computing 1 (6UOC)
ENGG1000 Engineering Design (6 UOC)

Plus
Year 1 Electives totallling 18 UoC

* Required elective:
MATS1192 Design & App of Materials (6 UOC)
* Recommended electives:
CVEN1300 or MINE1300 or MMAN1300 (6 UOC)
CHEM1011 or CHEM1031

"During my time studying Materials Science and Engineering I have met life long friends and had great experiences that i will always treasure. It was a great environment to learn in."

Cyndhia Reddy
Fourth Year Student

Stage 2

BIOM1010 Engineering in Medicine (6 UOC)
MATH2019 Engineering Mathematics 2E (6 UOC)
MATS2001 Physical Prop of Materials (6 UOC)
MATS2003 Materials Characterisation (6 UOC)
MATS2004 Mechanical Behaviour of Mats (6 UOC)
MATS2005 Intro Fluid Flow & Heat Trans (6 UOC)
MATS2006 Diffusion and Kinetics (6 UOC)
MATS2008 Thermodynamics & Phase Equilib (6 UOC)

Stage 3

BIOM9420 Clinical Laboratory Science (6 UOC)
MATH2089 Numerical Methods & Statistics (6 UOC)
MATS3001 Mechanical Behaviour in Metals (6 UOC)
MATS3002 Fundamentals of Ceramic Proces (6 UOC)
MATS3004 Polymer Sci & Engineering 1 (6 UOC)
MATS3006 Des App of Mats in Sci & Eng 3 (6 UOC)
6 UOC Professional Electives
6 UOC General Education

Stage 4

ANAT2511 Fundamentals of Anatomy (6 UOC)
PHSL2121 Principles of Physiology A (6 UOC)
PHSL2221 Principles of Physiology B (6UOC) or Biomedical Engineering elective (BIOMXXXX)
18 UOC Professional Electives

PLUS
MATS4008 Materials Engineering Project 12 UOC

OR
BIOM5910 Thesis Part A Elec,Tele, Mats (6UOC) andBIOM5911 Thesis Part B Elec, Tele, Mat (6UOC)

Stage 5

BIOM9332 Biocompatibility (6 UOC)
BIOM9410 Regulatory Req of Biomed Tech (6 UOC)
MATS3007 Materials Industry Management (6 UOC)
BIOM9914 Masters Project (12 UOC) or 2 X BIOM 9XXX Electives

PLUS
18 UOC (3 X 6 UOC Biomedical Engineering electives)

Graduating Class

3135	Honours	Academic Plan	Employment
Jing Xu	H1	Ceramic Engineering	Brickworks Ltd
Hong-Hao Chen	H2/1	Materials Engineering	Postgraduate Study at UNSW
Hsin Chen	H2/2	Materials Engineering	Postgraduate Study at UNSW
Imrana Kabir	H2/1	Materials Engineering	
Yuan Yuan Li	H2/1	Materials Engineering	
Steven Pert	H1	Materials Engineering	Rio Tinto
Christopher White	H1	Materials Engineering	Rio Tinto
Nanxi Lu	H1	Physical Metallurgy	CSR Bradford
Benjamin Miller	H2/1	Physical Metallurgy	ION Corp
Samual Xie	PASS	Physical Metallurgy	
Steven Flynn	H1	Process Metallurgy	ExxonMobil
Courtney Geraghty	H2/1	Process Metallurgy	Rio Tinto
Edwin Gosali	H2/2	Process Metallurgy	
Chi Ling Martin Soo	H2/1	Process Metallurgy	Verve Energy
Pandelis Toumbelekis	H1	Process Metallurgy	Silanna
Patrick Conway	H1	Process Metallurgy	Postgraduate Study at UNSW
3138	Honours	Academic Plan	Employment
Yuki Hayashi	H2/2	Physical Metallurgy	
David Miskovic	H2/2	Physical Metallurgy	Postgraduate Study at UNSW

STEVEN FLYNN

EXXONMOBIL

Steven John Flynn, recipient of the Hugh Muir Prize, with his family on Graduation day. Steven is currently working for ExxonMobil at the Altona Refinery as an Inspection Engineer in the Materials and Reliability Group. He is responsible for fixing equipment (piping, valves, heat exchangers and vessels) in the reforming units of the refinery. A typical day involves scoping repairs, root cause analysis, risk assessments, field inspections, nominating improvements to reliability and technical support to the business.

CHI LING MARTIN SOO

VERVE ENERGY

Martin took a graduate position working for Verve Energy in the engineering services division. Verve Energy is a state owned utilities corporation that provides the SWIS (South West Interconnected System) 55% of all electrical needs through the use of coal fired power stations. Martin notes that these power stations are more than 50 years old and it is very interesting to see how 'over engineered' construction was back then. He acknowledges that there are perks of holding a government position but occasionally there is an outage and 'all hell breaks loose'.

During his undergraduate degree Martin majored in Process Metallurgy and says that learning how a power plant operates has been a very steep but rewarding learning curve. In his position he undertakes a great deal of project co-ordination and NDT. But also works on investigating failures in relation to corrosion, fatigue, and its various mechanisms including caustic gouging, acid phosphate attack and minimum wall thickness. Martin acknowledges that courses taught by Associate Professors Runyu Yang and Sammy Chan during his undergraduate degree have been most helpful and that the Materials Science learning environment enabled him to put theory learnt to practical use.

In his short time working in industry, Martin has been accredited to work in confined spaces and operate an X-ray gun, received his construction induction card and participated in a huge range of training sessions to learn new skills and also to refresh your memory on previous skills.

Scholarship Programs

The School operates a comprehensive suite of scholarship programs for attracting and supporting high-achieving, motivated students in its materials science and engineering undergraduate degrees. In addition to providing financial support to students, the scholarship program gives students valuable opportunities to work in the Australian materials industry as well as the chance to apply and reinforce knowledge and skills learnt in undergraduate classes. The scholarship programs are:

Co-op Scholarship Program:
The Co-op Scholarship program provides students with a scholarship of ~$16,000 p.a. and 68 weeks industrial training throughout the BE degree. In 2011, there were 11 Co-op scholarships funded by 7 industrial industrial sponsors. (Refer to the separate Co-op Program report.)

Industry Partnership Scholarship Program:
The Industry Partnership Scholarship program provides students with $2,500 p.a and opportunity for industrial training with sponsors during summer vacation periods. In 2011, there were 14 sponsors providing over $55,500 p.a. to the School for 21 industry partnership scholarships.

School Scholarship Program:
The School has two perpetual scholarships established from benefactory funding from Sir Rupert Myers and the Thomson Family. The Sir Rupert Myers Scholarship commences once every 2 years at a stipend of $2,500 p.a. and is available to all students in the BE degree. The Thomson Family Scholarship commences once every 4 years at a stipend of $2,000 p.a. for students undertaking the Ceramic Engineering academic specialisation. The School also offers a number of School scholarships valued at $1,500-$2,000 depending on academic ability.

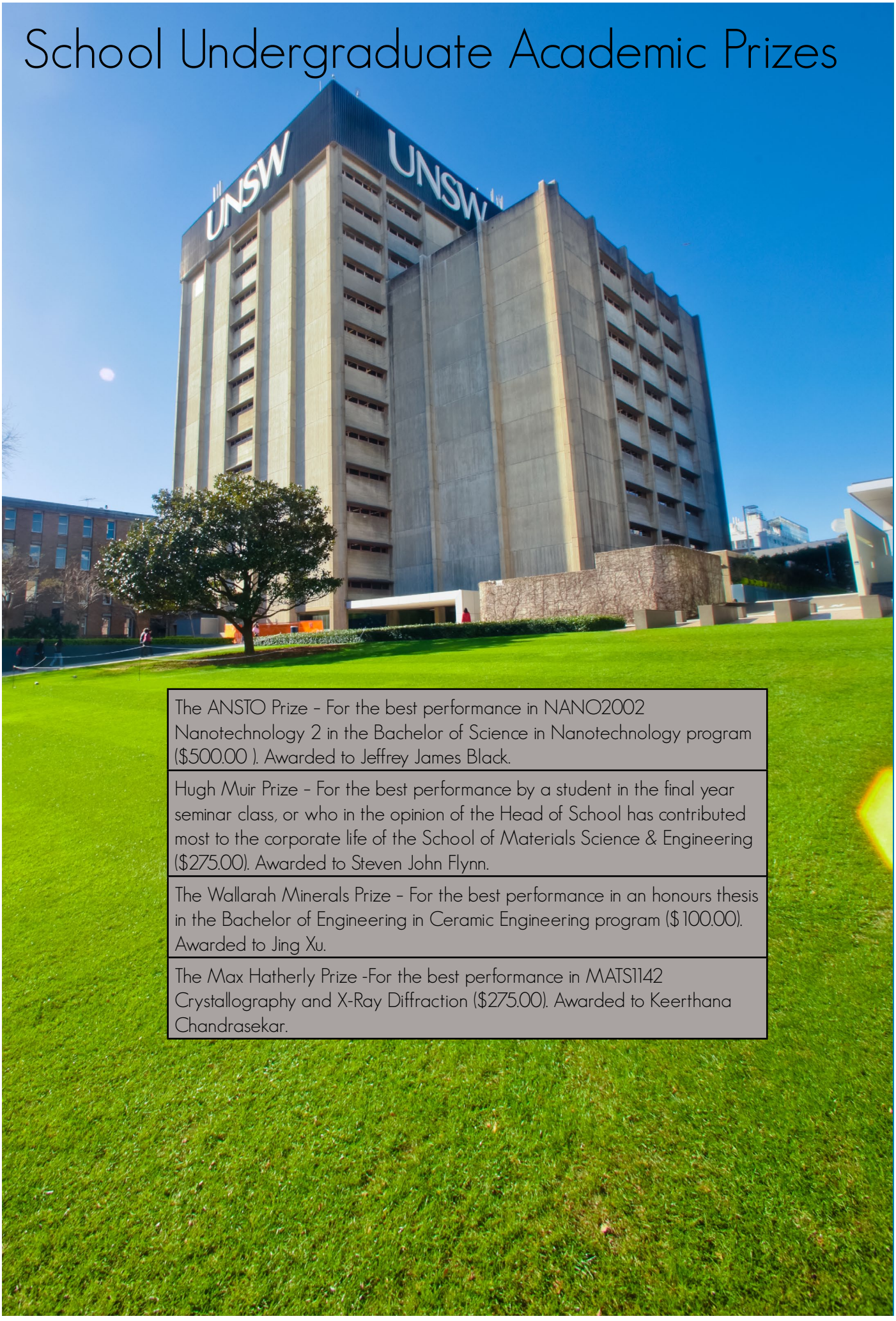
Scholarships awarded and sponsors over the past 5 years are summarised in Table 1. Scholars selected on the basis of written application and formal interview by panels consisting of Sponsor representatives and School academics and scholarships are awarded on the basis of academic performance, relevant materials experience, and interest in the discipline. All Scholars are required to maintain satisfactory academic progress throughout their academic studies and Scholar performances are reviewed at the completion of every semester.

The scholarship programs provide an important contribution to education of the School's undergraduate students and comprise an important facet of the School's strong partnership with industry. The School takes this opportunity to thank its many industrial sponsors for their generous and continued support.

Scholarship Committee
Veena Sahajwalla (Chair, and Coordinator of Industry Partner Scholarships)
Owen Standard (Coordinator of Co-op Scholarships)
Alan Crosky
Ros Haskew

Intake Year		2007	2008	2009	2010	2011
Number of Students	BE	24	16	27	20	52
	BMBioMed	4	9	12	15	25
Co-op Scholars		4	2	3	0	3
Industrial Partnership Scholars		4	8	5	6	6
Sir Rupert Myers Scholars		1	1	0	0	0
Thomson Family Scholars		-	-	1	0	0
School Scholars		-	7	14	12	23
% Scholarship Holders		32	72	59	51	30%
Sponsors		Alcoa Australia, Anglo Coal, ANSTO, Austral Bricks, Australia & New Zealand Steel Manufacturing Businesses (ANZSMB), BHP Billiton, Bluescope Steel Research, Boral Bricks, Bridges Institutional Broking, Bureau Veritas, Cochlear, CSIRO, LaserBond, OneSteel Ltd, Parex Davco, Rio Tinto Aluminium, Sandvik Materials Technology, Shinagawa Refractories Australasia P/L , TEMCO, Weir Minerals, X-Strata, Hitachi , Gujarat Coal				

School Undergraduate Academic Prizes



The ANSTO Prize – For the best performance in NANO2002 Nanotechnology 2 in the Bachelor of Science in Nanotechnology program ($500.00). Awarded to Jeffrey James Black.
Hugh Muir Prize – For the best performance by a student in the final year seminar class, or who in the opinion of the Head of School has contributed most to the corporate life of the School of Materials Science & Engineering ($275.00). Awarded to Steven John Flynn.
The Wallarah Minerals Prize – For the best performance in an honours thesis in the Bachelor of Engineering in Ceramic Engineering program ($ 100.00). Awarded to Jing Xu.
The Max Hatherly Prize -For the best performance in MATS1142 Crystallography and X-Ray Diffraction ($275.00). Awarded to Keerthana Chandrasekar.

Co-op Program

The Co-op Program is a scholarship program run in cooperation between the University of NSW and industry to provide scholarships and industrial training for undergraduate students in various degree programs. In the School of Materials Science and Engineering, scholarships are provided by sponsors in each of the 4 academic specialisations of Ceramic Engineering, Materials Engineering, Physical Metallurgy, and Process Metallurgy. The Co-op Program is a highly visible and very effective means to attract high-quality students into our discipline.

The first Co-op scholarships in Materials Science and Engineering commenced in 1989 and the success of the Co-op Program in delivering the above benefits to scholars and sponsors in Materials Science and Engineering is demonstrated by the strong and consistent support of the Program by industry: there has been a total of 125 scholarships from 30 different industrial sponsors since 1989. Co-op graduates are highly sought by industry and those students entering the materials industry usually rise to positions of leadership and management.

The Co-op Program attracts the academically strongest students (typically, ATARs are greater than 99.0) who, importantly, also have good leadership, teamwork, and communication skills. For students in Materials Science and Engineering, each scholarship provides ~$16,000 per annum for 5 years, 68 weeks of structured and highly relevant industrial training with up to 4 sponsor companies, the opportunity to experience typical graduate employment, and close access to potential employers. The Program provides industrial sponsors with highly motivated, capable students to complete important and valuable industrial work. It also provides sponsors the opportunity to have direct involvement in the education and development of our School's students and from whom they can potentially recruit their future managers and leaders.

A total of 11 scholarships (Table 1) were provided by 7 industrial sponsors in 2011 (Table 2). This represents an investment by industry of over $180,000 for the year. Compared with the previous year which was affected by the economic downturn and which had no new scholarships, 2011 saw three new scholarships established and these were sponsored by Bluescope Steel Research, TEMCO, and Rio Tinto Alcan.

Table 1:Co-op Program in Materials Science and Engineering - 2007 to 2011 Cohort Statistics

Intake Year		2007	2008	2009	2010	2011	Total
Current Year of Degree		4	3 (IT)	3 (IT)	2	1	
Number of Scholars							
	Ceramic Eng.	-	-	1	0	0	1
	Materials Eng.	3	2*	1	0	2	8
	Physical Met.	1	-	1	0	0	1
	Process Met.	-	-	-	0	1	1
	Total	4	2*	3	0	0	11
Number of Sponsors		4	2*	3	0	3	

* position vacated and unable to be filled – Scholarship terminated.

Table 2: Co-op Program in Materials Science and Engineering – Current Sponsors (2007-2011)

Alcoa Australia	Rio Tinto Alcan
Australia & New Zealand Steel Manufacturing	Businesses (ANZSMB)
Bluescope Steel Research	Shinagawa Refractories Australasia P/L
North Parkes Mines Rio Tinto	TEMCO

Scholars completed the following industrial training (IT) placements during the year: IT1 (10 weeks) by students at the end of their first year; IT2 (10 weeks) by students at the end of their second year; and IT3 (24 weeks) and IT4 (24 weeks) by students midway through their third year of study. Each IT placement was reviewed by the Academic Coordinator in the form of an interview with the scholar and sponsor representative(s). The scholar and sponsor also provided written appraisals of the placement. Each scholar also gave a short presentation to industry sponsors and fellow Co-op students summarising their IT work and, importantly, the technical and professional benefit they obtained from the placement. Judging from the placement interviews, written appraisals, and presentations, all placements were completed successfully and fulfilled the philosophy and objectives of the Co-op Program – for both scholars and sponsors. Industry sponsors indicated the significant quality and value of work completed by the scholars during their placements. The commitment of scholars and sponsors to the IT placements is fundamental to the success of the Co-op Program. The School thanks the sponsors for the efforts they put into organising the placements as well as their training, guidance, and support of scholars during the placements.

Co-op activities for the year included: welcoming function and induction ceremony for first year Co-op scholars, first year leadership camp, Co-op Working Party meeting combined with IT presentations, and a final-year student farewell dinner. The Co-op program appreciates the time and effort given by Sponsors to attend Co-op functions.

An online career manager system was developed and introduced by the Co-op Office in 2011. This system provides a portal for scholars to maintain their current contact details, résumé (it includes a useful résumé builder), IT placement details, etc. It also provides for electronic lodgement of IT placement review forms by scholars and sponsors, as well as holding these forms as a record of placements. The career manager will be available for Scholars after they leave University as a career development tool.

The academic performance of Co-op scholars in 2011 was high and significantly above that of other students, as in previous years. All scholars met the academic requirements for continuation in the Co-op Program. Four Co-op scholars graduated from the School in 2010 – three received First Class Honours and one received Second Class/Division 1 Honours. Well done to all. Three of the graduating Co-op scholars obtained employment with sponsor companies.

The School thanks all of its Co-op sponsors for their continued generous support.

Dr. Owen Standard
Academic Coordinator
Co-op Program in Materials Science and Engineering


UNSW

Outbound Exchange Student

Andrew Nelson

After months of anticipation, and a few fond goodbyes at Sydney airport, it was finally time to explore the different shower knobs and electric sockets of North America, something that I've always wanted to do. A little bit of planning, and some world map dart throwing, eventually led me to start an exchange semester in Toronto, situated on the great lakes of Eastern Canada.

But first for the pre-trip. North America finally welcomed me with 30 degree plus weather that followed me through the first two weeks of my six month adventure - a welcome surprise after a grueling Sydney winter. Landing in LA and making my way down to Newport Beach, the heat was no disincentive to get stuck into some outdoor fun. As Hurricane Irene blew over New York, I managed to join a college track team, as well as joining in with a few typical Californian 'extra curricula' activities – igniting a new love for the American national sport of beer pong.

Skipping a few chapters, and meeting some new travel buddies, we nervously crossed the French Canadian border on the wrong side of the road at 2am in the morning. Not knowing how to read French, we eventually bumbled our way through Quebec City, Montreal and some equally impressive French influenced cities and towns on the way west to Toronto.

As one of the top Universities in the world I knew I was in for some trouble once it come time to start classes. Between getting lost finding lectures, and 'frosh' week activities, it eventually became obvious at the enormity of UofT's campus, which, along with spectacular 19th century buildings, housed 3 indoor pools, 2 indoor tracks, a football field, driving range, ice rink and countless other places to entertain yourself in between breaks. Come assessment time though, these were no excuses to fall behind the rest of the over enthusiastic students in class. Other excuses however made more of an impression, and my new friends were certain to ensure the harmlessness of 'a few' friendly beers at the local.

By the end of the semester, weekend and holiday breaks had led us on countless adventures. From canoeing with beavers or moose hunting among the fall leaves, to running scared in Detroit and being awed by Chicago's famous bean, Jazz and deep dish pizza. This was just the start of a bigger adventure though, through some of the largest, and smallest, cities of America and Mexico, while the rest of my newly made friends began their annual winter hibernation in the library. The next part of my trip led us to swim with turtles, pat tigers, see some of the most beautiful icons of America and see the most incredible sunsets over deserts and tropical islands, but the friends we made in each new city definitely made this the most unforgettable experience of my life so far.

A tip to anyone reading, go on exchange!

Andrew Nelson
Fifth Year, BE/MBiomed

Industrial Training Experience

Araxi Ohanessian

Going into my fourth year of studies in my Materials Science / Biomedical Engineering degree, the time had come to get myself out there in the workplace and complete the required 60 days of industrial training. After numerous emails, phone calls and interviews, I was finally hired by James Hardie.

I commenced with the company on 5th December 2011, where I was warmly welcomed by the Research and Product Development team. The team consists of forty engineers from many different disciplines and of differing seniority, as well as several graduates and Co-op students, many of whom currently attend or have previously attended UNSW. After all the meeting and greeting, it was time to be inducted into all the labs and sites, followed by getting assigned my first lot of tasks.

The bulk of the work consisted of testing cement-based materials at all stages of the process; ie from raw state, to processing, and finally to the finished product. All data obtained from the tests was put into my very own database which the whole R&D team would access moving forward.

Half way through my placement, I was fortunate to be given the opportunity to travel to New Zealand for 3 weeks. I was speechless when I found out I was the first student who had been allowed to travel and had been employed for a shorter time than any other employee before travelling with the company. This was great, not only because all expenses were paid for, but more importantly it gave me the opportunity to run production lines/ trials and learn new testing techniques within sites where our products were in use.

My overall experience at James Hardie was truly positive, not to mention practical, as it allowed me to put my skills and knowledge which I had acquired at UNSW to great use. Upon completion of my 60 days, I was offered a casual role with the company, which I was honoured to accept.

Industrial Training Experience

Giehard Nebre

Giehard is in his final year of studies for his Bachelor of Engineering (Materials Science and Engineering). He commenced his studies in 2006, and in 2007 was engaged by OneSteel as a Trainee Metallurgist. Last summer OneSteel extended to Giehard the opportunity to further his professional development with three months secondment to the one of the company's newly acquired mining consumables operations in Chile. Giehard describes his experience for us:

The objectives of my overseas secondment were:

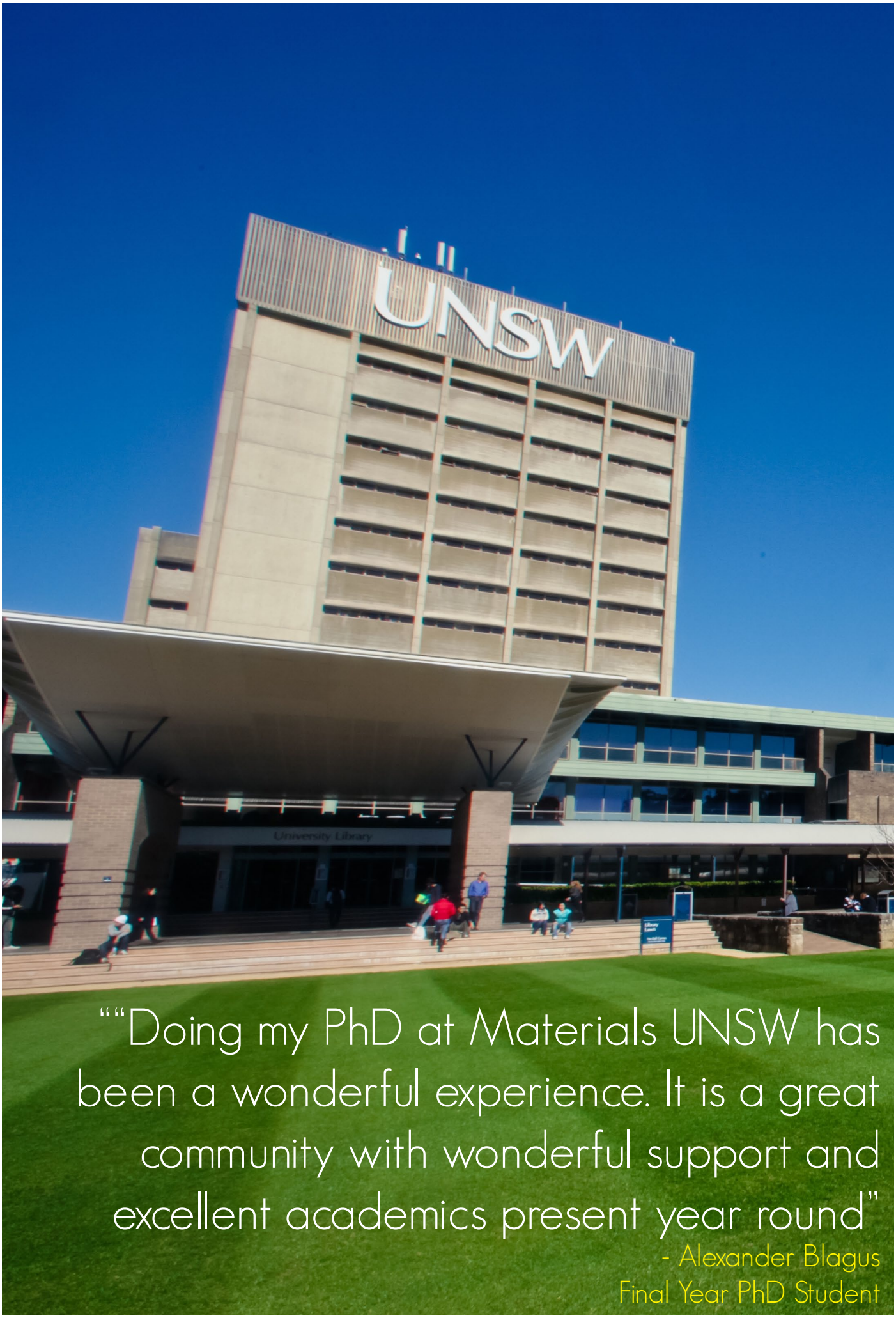
- to gain greater exposure to OneSteel's Moly-Cop business in South America.
- to further my overall professional development in the fields of metallurgy, operations, engineering and applications.
- to expand my professional network
- to contribute to an exchange of knowledge between Australia and Chile in regards to operations, metallurgy and quality control systems.

The Moly-Cop Group is part of OneSteel's Mining Consumables Business Division which produces grinding media. Essentially grinding media are heat treated steel balls used to grind ore to liberate the precious mineral from the rock. The crushed ores are fed into huge rotating drums called Semi-Autogenous (SAG) Mills for primary grinding, then fed into ball mills for further fine grinding. Both SAG and ball mills contain grinding media to aid in the liberation of the precious mineral from the grinding action.

While in Chile I was based in the city of Concepcion. My role was to assist my fellow metallurgists to develop the company's product by increasing the toughness and wear-resistance of its SAG Mill balls. I was given responsibility for a particular ball improvement project. I had to evaluate the material attributes of balls made from aluminium-deoxidised steel instead of silicon deoxidised steel. This included running controlled trials, sample collections and conducting a metallurgical investigation on the newly created balls. I found that the courses I had studied at the School of Materials Science and Engineering prepared me very well for this task.

I also gave presentations to my fellow metallurgists and quality inspectors to inform them about materials characterisation techniques employed at OneSteel's Waratah Metallurgical Laboratory in Newcastle, which could be utilised at their metallurgical laboratory in Mejillones. My presentation topics included macro-etching techniques, interpreting the macrostructure, phase identification from metallography, evaluating steel cleanliness and fractographic analysis of our balls when they fail.

In all, it was a very busy three months. I feel very fortunate that my materials engineering background gave me this opportunity to work abroad and even lead an important product development initiative. I learnt a lot from my South American colleagues and I think they learnt a lot from me. If I were asked if I would do it again, my answer is a definite sí.



"Doing my PhD at Materials UNSW has been a wonderful experience. It is a great community with wonderful support and excellent academics present year round"

- Alexander Blagus
Final Year PhD Student

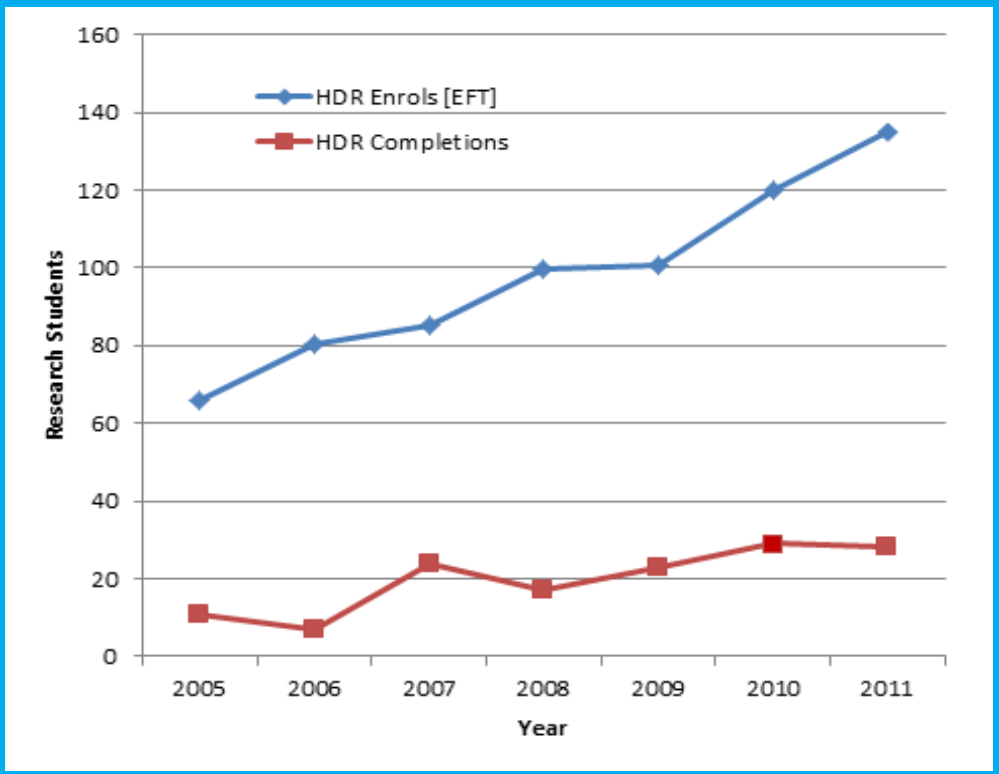
The Postgraduate Experience

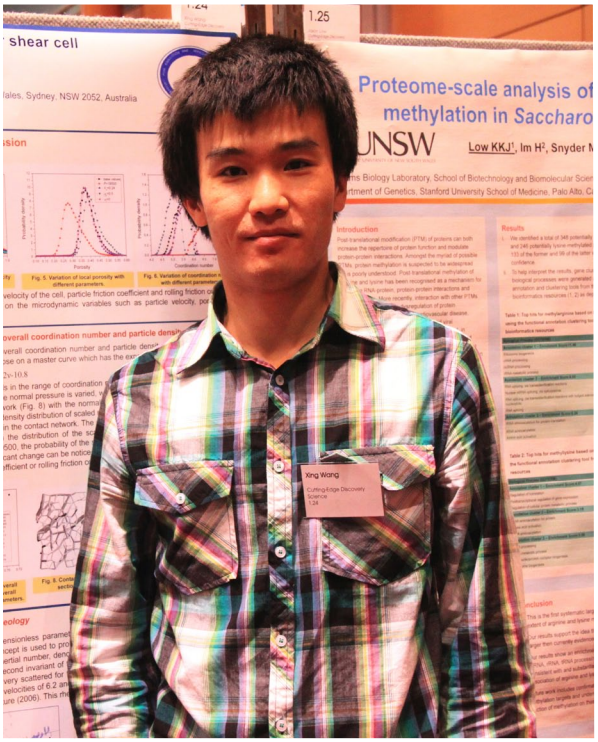
Postgraduate Research

The School's postgraduate research students are the backbone of its outstanding research quality. The School is clearly the destination of choice in the field within Australia for both local and international research students. The performance of the School's students is reflected in consistent timely completion of their degrees and high rates of publication of their research in leading international journals.

The past few years have seen both a rise in research student numbers and a steady rate of timely completions. There has also been a marked increase in international students as a fraction of the overall student body with the fraction of international to local higher degree research (HDR) students enrolled in the School changing from 41.6 in 2009 to 67.3in 2012. The number of local HDRs has decreased by 20% over the same period while international enrolments have increased by 76%.

The School has developed a number of initiatives focussed towards research students in recent years. A English language writing program has been developed in conjunction with the UNSW Learning Centre and has proven highly successful as evidenced by the performance of students in their first reviews and quality draft papers. The School has also created a postgraduate research student society whose report follows. It organises a number of very popular events.





Postgraduate Student Society

The inaugural year for the Materials Science Postgraduate Student Society proved to be a resounding success. The purpose of this student-managed society was twofold: Firstly, to provide an additional mechanism for postgraduate students to communicate feedback and resolve issues with the School management, and secondly to encourage interdisciplinary discussion between the students themselves. To this aim, the society organized a number of social and academic events to encourage participation and discussion within the school.

The first event was a social picnic, held in Centennial Park on an unseasonably warm Saturday in May. An enjoyable afternoon of chatting, Frisbee-throwing, and the occasional defending of lunch from ravenous Golden Retrievers ensued. Better still, that day proved to be the last opportunity to enjoy the warmth before a memorably cold and rainy winter!

A fortnightly presentation competition undoubtedly constituted the major organisational effort of the postgraduate student society in 2011. This was a 'knockout'-style competition, with four speakers competing in each round for a chance to graduate to the finals. The competitors, predominantly PhD students in their third year of study, presented a five-minute presentation outlining their thesis topic and its significance. Presentations were judged according to their content and clarity by a randomly selected panel. In November, the six finalists gave extended presentations to a panel of academics and an audience so large there was barely room to stand. In an exceptionally competitive field, the deserving winner of the tournament was Matthew Komiyama who presented an exciting and informative talk entitled "How to make blast furnaces last longer – a computer aided analysis". Matthew received $500 for conference travel from the school, and went on to present his work at the NSW Materials Australia Student Seminar.

The student society also organized the annual School of Materials Science & Engineering Research Symposium, a poster competition for the postgraduate research students in the School. Now in its third successive year, the Research Symposium was well attended by students and postdoctoral researchers spanning a broad range of research subjects. The posters were judged by Prof. Chris Sorrell (School of Materials Science), Dr. David Pinson (Bluescope Steel) and Maryam Khajeh (Faculty of Science Commercialisation Manager). After considerable time (and no doubt anguish), the judges selected three winners (Matthey Komiyama, Hugh Simons and Jake Cao) and four runners up (Neil Lazo, Yansong Shen, Joseph Arsecularatne and Dorian Hanaor) from the large field of entrants.

After a great start, the Materials Science Postgraduate Student Society is now in the process of implementing a host of improvements to the poster and presentation competitions as well as organizing new events for the 2012 academic year.

Hugh Simons

Postgraduate Areas of Research

Name	Current	Supervisor(s)	Area of Research
AFRIN ZINNIA, Nasima (Afrin)	PhD	MF/PM	Electron Backscattered Diffraction Applied to Solid State Transformations
AL-ELYANI, Mansaur Mohammad	PhD	SC/AC	Stress-Corrosion Cracking of Metal Matrix Composites
ALZEGHAIBI, Othman N. J.	PhD	VS/RK	Desulfurisation Process
BANDYOPADHYAY, Rakhi	PhD	SG/VS	CNT-Reinforced Epoxy Matrixs for Advanced Composites
BILETSKA, Olga	PhD	MF/KL	Bulk Metallic Glasses for Ballistic/Armour Applications
BLAGUS, Alexander V.	PhD	VS/PK	Recycling Waste Plastics in Iron Processing
CAO, Qinghua	ME	JD/	Thermoelectrics
CAO, Yang	PhD	MF/KL	Synthesis and properties of Bulk Metallic Glasses
CAO, Yi	PhD	MF/KL	Processing and Properties of Al-Based Metallic Glasses
CHEN, Chuyang	PhD	XCJ/RZ	Particulate Processing
CHEN, Cong (Sarah)	PhD	SL/TSZ	Thermoelectric Materials
CHEN, Jason	PhD	NV/CS	Oxide nanostructures by PLD
CHEN, Jiang (John)	PhD	AY/RZ	Modelling of Particulate Systems
CHEN, Li	PhD	AY/QZ	Nanotechnology
CHEN, Wu Ming	PhD	AY/XCJ	Nanoparticles
CHEN, Yen-Chih (Marat)	ME	AY/BG	Computer Simulation of blast Furnace Process
CHENG, Xuan (Heidi)	ME	NV/PM	Interfaces of Ferroelectrics
CHEUNG, Jeffrey	PhD	NV/KO	Metal Oxide Nanostructures
CHIA, Chee Hung	PhD	PM/SJ	Synthesis of Terra Preta Biochars
CHUANG, Li-Pu (Kris)	PhD	SL/CS	Thermoelectric Materials
CLINCH, Samantha B.	PhD	CS/AC	Recycling Waste Plastics in Aluminium Processing
CUI, Yongli	PhD	OO/GZ	Carbonylation of Nicel, Cobalt and Iron
D'ABBADIE, Lois P.S.	PhD	SL/CCY	Thermoelectrcs
DANKWAH, James R.	PhD	VS/RK	Utilisation of Waste Plastics in Steelmaking
DING, Rui	PhD	SL/DW	Interface Engineering
EDISTA, Ignatius E.	ME	RY/AY	Simulation of Stockpiling of Cohesive Paticles
ELIAS, Elias Nasser	PhD	AC/SC	Stress Corrosion Cracking of Rock Bolts
EMAMI KHANSARI, Sayedeh	PhD	MH/MF	Design of Metallic Thin Films
ESFANDIARY, Amir Hossain	PhD	AY/KD	Multiphase Flow Modelling
FAHADEJ SADI, Seyed Habib (Habib)	Mphil	VS/MZ	Recycled Plastics
FU, Haitao	PhD	AY/	Nanotechnology
GAN, Jieqing	PhD	GZ/OO	Coke Characterisation
GHENO, Thomas	PhD	DY/JZ	Alloying for Resistance to High Temperature CO2 Corrosion
GHODRAT, Maryam	PhD	AY/SK	Multiphase Flow Modelling in Coal Preparation
GUO, Wei (Gregory)	PhD	MF/MH	Thermomechanical Behaviour of Titanium Alloys
HALIDAN, Musha	PhD	AY/SC	Computation of Powder Mixing and Experiment
HAMBE, Michael	PhD	NV/PM	Ferroelectric/Ferromagnetic Tunnel Junctions
HANAOR, Dorian A.	PhD	CS/OS	Photocatalytic Titania Properties
HANG, Tian (Anneliese)	PhD	MH/JG	Fatigue of Lead-Free Piezoelectrics
HAYAZI, Nur Farhana (Hana)	PhD	SC/AC	Aluminium Matrix Composites
HEDAYATI, Alireza	ME	SC/	Near Net Shape Fabrication of Titanium/Matrix Composite
HOU, Qinfu	PhD	AY/BG	Modelling of Particle-Fluid Flow in Steelmaking
HUANG, Hsin-Hui (Sonia)	PhD	PM/NV	Microstructural Analysis of Thin Films
HUANG, Shih-Ying Esther	PhD	NV/PM	Granulation of Iron Ore Fines
IBRAHEEM, Shahad Adnan	ME	SB/CS	Nanocomposites

Name	Current Degree	Supervisor(s)	Area of Research
IDRIS, Muhammad A. (Asri)	PhD	SL/LS	Doping of Titania
JANG, Dong-Min (James)	PhD	VS/GP	Recycling Waste Plastics in Manufacturing
JEE, Kyung Eun	ME	VS/SG	Influence of Non-Premium Carbons on Coke
JOHNSTON, Mehrnoosh	PhD	AY/BG	Granular Flow
KABIR, Md Rezaul (Reza)	PhD	SL/TSZ	Thermoelectric Materials
KANETI, Yusuf Valentino	PhD	AY/RZ	
KEMPTON, Leela M.	PhD	AY/PZ	Blast Furnace Modelling
KHANSUR, Neamul Hauet	PhD	JD/MH	Actuation Mechanisms in Lead-Free Piezoelectrics
KO, Kwan Hyun	PhD	VS	
KOMIYAMA, Keisuke Matthew	PhD	AY/BG	Blast Furnace Multifase Flow
KWONG, Wai Ling (Canny)	PhD	CS	Photocatalytic Titania
LA ROBINA, Michael	PhD	MF/CS	Induction Heating of Materials
LAU, Kok Tee (KT)	PhD	CS/MH	Ceramic Coating for Cutting Tools
LAZO, Neil Isarael	PhD	MH/MF	Design of Low-Sensity Metal Structures
LEE, Chia Hung (Daniel)	PhD	PM/SJ	Biochars from Algae
LEE, Jiunn Jieh (JJ)	PhD	SL/YZ	Diluted Magnetic Semiconductors for Spin Transistors
Li, Ann	ME	PM/MH	Diamond-Like Coatings
LI, Changxhing	PhD	AY/ZZ	Studies of Multiphase Flow in Fluid Bed Reactors
LI, Huan (Amanda)	PhD	DY/JZ	HighTemeperature Corrosion in H2O/CO2 Gases
LI, Ke	PhD	AY/RZ	Gas-Solid Flow Modelling
LI, Yan	PhD	GZ/OO	Production of Titanium Tetrachloride
LI, Zhaoyang (Eddie)	MSc	AY/RZ	Multiphase Flow Modelling
LIANG, Liuen (Olivia)	ME	XCJ/AY	Nanotechnology
LIM, Kean Long	PhD	SC/RY	Hydrogen Storage
LIN, Christine Yi Wen	PhD	CS/OS	Titania Coatings
LIU, Jiayin (Vivian)	PhD	NV/CS	Metal Oxide Magnetic Nanomaterials
LIU, Ning	ME	RY/AY	Particle Breakage During Grinding
LIU, Peiyan (Peter)	PhD	AY/XCJ	Synthesis and Application of Nanoparticles
LIU, Sida	PhD	AY/	Particle Technology
LOTT, Oliver	PhD	MH/OS	Interfaces of Composites
LUM, Michael	PhD	MH/AC	Abrasion of Rubbers
LYNCH, Jane Bridget	PhD	AC/PM	Life Cycle Assessment of Biochars
MADA, Mykanth (Myke)	PhD	SB/CS	Nanocomposite Materials for Clean Energy
MANSURI, Irshad Ahmad	PhD	VS/DN	Transforming Waste into Carbons for Fe-C Alloys
MARAN, Ronald	PhD	NV/PM	Lead-Free Piezoelectric Thin Films
MASSIE, Franciskus Arthur	ME	SL/TSZ	Thermoelectrics
McNEIL, Steven	PhD	OS/MP	Sol-Gel Coating in Textiles
MENG, Fanyu	PhD	SG/VS	Mechanism of Coal Mineral Trasformations
MOHAMAD WAHID, Mohd Fitri	PhD	MF/KL	Processing and Properties of Aluminium-Based BMGs
MOHAMMADALI, Saeed	PhD	OS/NV	Castablr Refractories
MOHD YUNOS, Nur Farhana D.	PhD	VS/RK	Recycling Waste Plasrics in Steelmaking
MUCHTAR, Hadi Wahyudi	PhD	AY/HZ	Modelling of Gas-Solid Flow
MUDDAAM, Swathi	PhD	VS/RK	Processing of Alluminium Alloys
NGUYEN, Duong Dinh (Dinh)	PhD	CS/PK	Cementitious Tile Adhesives
PARK, Hyusink (Hewitt)	PhD	VS/MZ	Recycling Plastics and Rubber in Steelmaking
PENGRIAN HAJI DURAMAN, Norazim	PhD	SC/RY	Remote Area Power Supply System
PHAM, Anh Dunh	PhD	SL/YZ	Spintronics
PHAM, Huynh Chau	PhD	CS/GF	Titania-Coated Packaging Systems
PHOTONGKAM, Pat	PhD	SL/CS	Spintronics
PINCOTT, Matthew J.	PhD	AC/MF	Stress Corrosion of Aluminium Alloys
RIDER. John R.	PhD	CS/	Raman Microspetroscopy of Ceramics

Name	Current	Supervisor(s)	Area of Research
RIDER, Myca I.	ME	CS/OS	Digitalised Microstructural Analysis of Concrete
SCICLUNA, John Paul	PhD	MF/KL	Processing and Properties of Metallic Glasses
SABBAGH ALVANI, Mohsen Milad	MSc	JD/OS	Textured Electroceramics
SHAMLAYE, Karl Francis	PhD	MF/KL	Bulk Metallic Glasses
SHEN, Fenglei (Steve)	PhD	VS/SG	Influence of processing Conditions adn Coal Properties on Coke
SHIOZAWA, Tomo	PhD	AY/PA	Blast Furnace Modelling
SIMONS, Hugh	PhD	MH/AC	Modelling of Impact on Metal Foams
SOATTHIYANON, Niphaphun (Bua)	PhD	AC/DR	Natural Fibre Composites
SULLAPHEN, Jivika	Mphil	NV/PM	Natural Fibre Composites
SUN, Weifu	PhD	AY/QZ	Surface Coating
SUNDARAM, Sankara R.K.	PhD	NV/PM	Scan Probe Investigation of Ferroelectronics
TANG, Chi Ho George	PhD	MH/MF	Cyclic Fatigue in Nanocrystalline Metals
TIAN, Ruoming (Serena)	PhD	SL/YZ	Spintronics
TONG, Zhenbo	PhD	AY/RY	Granular Simulation
TSAI, Ben P.J.	PhD	SC/SL	Hydrogen Storage
VASUDEVAN, Rama Krishna	PhD	NV/PM	Ferroelectric Domains in BFO Thin Films
WALKER, Julian Bradley	PhD	CS/NV	Piezoelctric Development
WAN, Xiaohan (Emily)	PhD	GZ/OO	Carbothermal Synthesis of Cilicon Nitride
WANG, Mengxi (Mark)	PhD	AY/RY	Simulation of Granular Flow
WANG, Minghao (Benny)	PhD	RY/AY	Modelling of Particle Breakage
WANG, Xing	PhD	AY/RY	Preparation and Applications of Nanoparticles
WEN, Ru	PhD	XCJ/AY	Nanotechnology
WU, Yun-Qi (Beryl)	PhD	MH/JG	Ceramic Wear Mechanism pf Dental Enamel
XIA, Bo Shi	PhD	AY/RZ	Powder Rheology
XING, Xing	PhD	GZ/OO	Reduction of Titanium Tetrachloride by Hydrogen
XIONG, Shi Xiang (Danny)	PhD	AY/QZ	Nanoparticle Assembly
XU, Menghua	PhD	AY/RZ	Particle Mechanisms
XU, Wen	PhD	AY/XCJ	Polymer Nanocomposites
YANG, Jun	PhD	GZ/OO	Solar Silicon Production
YANG, Si Yuan (Eric)	PhD	AY/RY	Processing of Nanoparticles
YANG, Wenjing	PhD	AY/RZ	Flow Pattern, Heat Transfer and Reactions in a Blast Furnace
YANG, Xiaohong (Carrie)	PhD	AY/XCJ	Metal Oxide Nanoparticles
YAO, Yin	PhD	SC/AC	Stress Corrosion Cracking of Aluminium-Based Composites
YE, Yang	ME	SL/TTT	Nanostructured Optoelectronics
YE, Zhuozhu (Stella)	PhD	VS/RK	Recycling Waste Materials
YEH, Chun-Hung (Alex)	Mphil	GZ/OO	Effect of Hydrogen on Aluminium Nitride Synthesis
YI, Liang Yu (Lance)	PhD	AY/RY	Simulation of Settling of Multi-Sized Particles in Liquids
YIN, Huaying (Maggie)	PhD	DY/SC	High-Temperature Oxidation
YOUNIS, Adnan	PhD	SL/DC	Semiconducting Nanostructures
YU, Le (Kevin)	ME	GZ/OO	Behaviour of Impurities in Carbothermal Reduction of Silica
YUE, Yui On (Jeffrey)	PhD	AY/RY	Nanotechnology
ZAKARIA, Mohd Nazarudin (Aji)	PhD	AC/SB	Natural Fibre Composites
ZHANG, Huiming (Josh)	PhD	AY/RY	Granular Materials Processing
ZHANG, Jing (Maggie)	PhD	GZ/OO	Gassification of Carboneceous Materials
ZHANG, Qi (Peggy)	PhD	OS/NV	Processing of Ceramic for Orthopaedic Applications
ZHANG, Renzhong (Nick)	Mphil	CS/AN	Photocatalytic Titania
ZHANG, Benny Weiguang	ME	RYAY/KC	Modelling of Pharmaceutical Powder Dispersions
ZHANG, Yichi (Lawrence)	PhD	MH/JG	Lead-Free Piezoelectrics
ZHANG, Zhengjie (Jeff)	PhD	XCJ/AY	Synthesis of Metal Oxide Nanoparticles
ZHENG, Qijun	PhD	AY/RY	Particle Mechanics
ZHU, Beibei	PhD	SL/TSZ	High-Z Thermoelectrics

Postgraduate Supervisors

AC	=	Alan Crosky (Professor)
AN	=	Auppatham Nakaruk (Research Associate)
AY	=	Aibing Yu (Scientia Professor)
BG	=	Bao Yu Guo (Research Associate)
CS	=	Chris Sorrell (Professor, Postgraduate Research Coordinator)
DC	=	Deiwei Chu (Postdoctoral Fellow)
DN	=	Dilip Nath (Postdoctoral Fellow)
DW	=	Danyang Wang (Research Associate)
DY	=	David Young (Professor)
GZ	=	Guangqing Zhang (Lecturer)
JD	=	John Daniels (Lecturer)
JG	=	Julia Glaum (ARC Postdoctoral Fellow)
JZ	=	Jianqiang Zhang (Senior Research Fellow)
KC	=	Keiwei Chu (Postdoctoral Fellow)
KD	=	Kejun Dong (Postdoctoral Fellow)
KL	=	Kevin Laws (Postdoctoral Fellow)
MF	=	Michael Ferry (Professor)
MH	=	Mark Hoffman (Professor, Head of School)
MZ	=	Magda Zaharia (Postdoctoral Fellow)
NV	=	Nagarajan Valanoor (Associate Professor)
OO	=	Oleg Ostrovski (ARC Professorial Fellow)
OS	=	Owen Standard (Senior Lecturer)
PM	=	Paul Munroe (Professor, Director Electron Microscope Unit)
RK	=	Rita Khanna (Associate Professor)
RY	=	Runyu Yang (Associate Professor)
RZ	=	Ruiping Zou (ARC Postdoctoral Research Fellow)
SB	=	Srikanta Bandyopadhyay (Associate Professor)
SC	=	Sammy Chan (Associate Professor)
SG	=	Sushil Gupta (Senior Research Fellow)
SK	=	Shibo Kuang (Postdoctoral Fellow)
SL	=	Sean Li (Professor)
TSZ	=	Tian Shu Zhang (Postdoctoral Fellow)
TT	=	Thiam Teck Tan (Postdoctoral Fellow)
VS	=	Veena Sahajwalla (Scientia Professor)
XCJ	=	Xuchuan Jiang (ARC Future Fellow)
YZ	=	Yuebin Zhang (Postdoctoral Fellow)
ZZ	=	Zongyang Zhou (Postdoctoral Fellow)

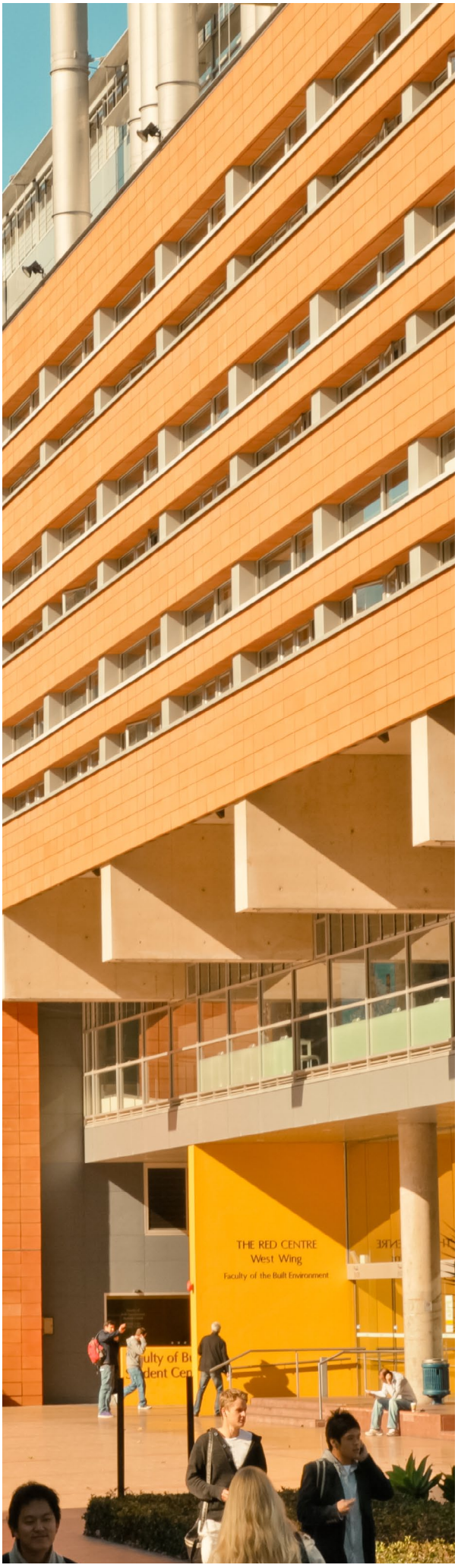
External

CCY	=	Chuncheng Yang (University of Sydney)
GF	=	Graham Fleet (UNSW School of Food Science & Technology)
GP	=	Gangadhara Prusty (UNSW School of Mechanical and Manufacturing Engineering)
HZ	=	Haiping Zhu (Researcher)
KO	=	Kostya Ostrikov (CSIRO)
LS	=	Leigh Sheppard (University of Western Sydney)
MP	=	Mike Pailthorpe (LincLab Pty Ltd)
PA	=	Peter Austin (BlueScope Steel Research)
QZ	=	Qinghua Zeng (University of Western Sydney)
SJ	=	Steven Joseph (Researcher)

Postgraduate Scholarships

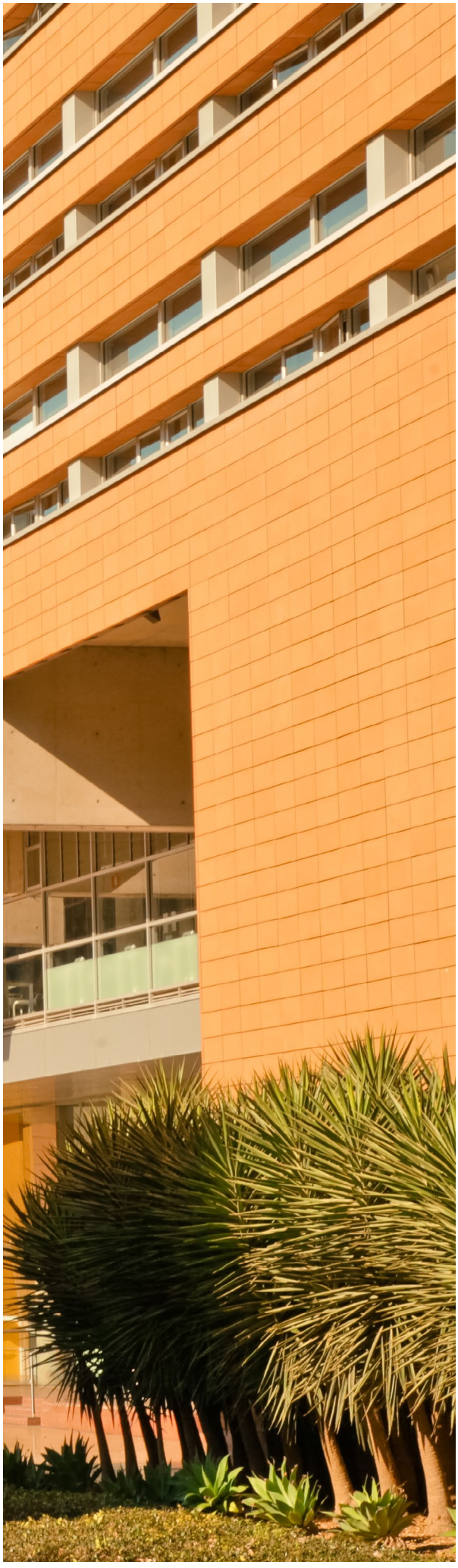
Last Name	First Name	Award Description
Afrin Zinnia	Nasima	Materials Science - ARC funded Proposal KIT
Bandyopad-hyay	Rakhi	Materials Science funded Scholarship
Biletska	Olga	Materials Science funded Scholarship
Blagus	Alexander	APA(I) - 2007+ LP grants
Cao	Yi	University International Postgraduate Award
		ARC Centre of Excellence Top-Up Scholarship
		Australian Postgraduate Award APA
Cao	Jake	Australian Postgraduate Award APA
		Materials Science funded Scholarship
Cao	Qinghua	Materials Science funded Scholarship
Chen	Li	ARC MD Modelling of nano composites
Chen	Wu	Materials Science funded Scholarship
Chen	Jason	Materials Science funded Scholarship
Chen	Chuyang	Tuition Fee Scholarship (TFS)
		APA-International holder
Chen	Jiang	Tuition Fee Scholarship (TFS)
		APA-International holder
		Materials Science funded Scholarship
Chen	Cong	Tuition Fee Scholarship (TFS)
		Tuition Fee Scholarship (TFS)
Cheng	Xuan	Materials Science funded Scholarship
Cheung	Jeffrey	Materials Science funded Scholarship
Chia	Chee	APA-International holder
		Tuition Fee Scholarship (TFS)
Chuang	Li-Pu	Materials Science funded Scholarship
Clinch	Samantha	Materials Science funded Scholarship
		Australian Postgraduate Award APA
Cui	Yongli	Materials Science funded Scholarship
		Tuition Fee Scholarship (TFS)
D'Abbadie	Lois	Materials Science funded Scholarship
Dankwah	James	Materials Science funded Scholarship
Ding	Rui	Materials Science funded Scholarship
Dinh	Nguyen	Tuition Fee Scholarship (TFS)
Elias	Elias	Materials Science funded Scholarship
Emami Khansari	Sayedeh	Tuition Fee Scholarship (TFS)
Esfandiary	Amir	APA(I) - 2007+ LP grants
		Tuition Fee Scholarship (TFS)
Fu	Haitao	Materials Science funded Scholarship
		Tuition Fee Scholarship (TFS)
Gan	Jieqing	University International Postgraduate Award
Ghodrat	Maryam	APA(I) - 2007+ LP grants

Surname	First Name	Award Description
Halidan	Musha	Tuition Fee Scholarship (TFS)
		Science - Materials Science funded Top-ups
Hanaor	Dorian	Australian Postgraduate Award APA
		Materials Science funded Scholarship
Hang	Tian	Tuition Fee Scholarship (TFS)
Hedayati	Alireza	Materials Science funded Scholarship
Hossain	Muhammad	Materials Science funded Scholarship
Hou	Qinfu	Materials Science funded Scholarship
Huang	Shih-Ying	Australian Postgraduate Award APA
Huang	Hsin-Hui	Tuition Fee Scholarship (TFS)
Jang	Dong-Min	Postgraduate Research Student Support (PRSS)
		Materials Science funded Scholarship
Kabir	Md.	Tuition Fee Scholarship (TFS)
Kaneti	Yusuf	Australian Postgraduate Award APA
		Materials Science funded Scholarship
Kempton	Leela	Materials Science funded Scholarship
		Australian Postgraduate Award APA
Khansur	Neamul	Tuition Fee Scholarship (TFS)
Ko	Kwang	Materials Science funded Scholarship
Komiyama	Keisuke	APA(I) - 2007+ LP grants
		Materials Science funded Scholarship
Kwong	Wai	University International Postgraduate Award
		University International Postgraduate Award
La Robina	Michael	Science - Materials Science funded Scholarship
Lazo	Neil	Tuition Fee Scholarship (TFS)
Lee	Jiunn	Materials Science - ARC funded Proposal KIT
Li	Huan	Postgraduate Research Student Support (PRSS)
Li	Yan	Tuition Fee Scholarship (TFS)
		Materials Science funded Scholarship
Li	Zhaoyang	Materials Science funded Scholarship
Li	Changxing	APA-International holder
		Tuition Fee Scholarship (TFS)
Li	Ke	Tuition Fee Scholarship (TFS)
		APA-International holder
Li	Huan	Materials Science funded Scholarship
		Australian Postgraduate Award APA
		Materials Science funded Scholarship
Liang	Liuen	Materials Science funded Scholarship
Liu	Ning	Materials Science funded Scholarship
Liu	Sida	Materials Science funded Scholarship
Liu	Peiyuan	Materials Science funded Scholarship
Liu	Jiayin	Australian Postgraduate Award APA
Liu	Sida	Tuition Fee Scholarship (TFS)
Mada	Mykanth	Tuition Fee Scholarship (TFS)
Mansuri	Irshadahmed	Australian Postgraduate Award APA
Maran	Ronald	APA(I) - 2007+ LP grants



Surname	First Name	Award Description
Meng	Fanyu	Tuition Fee Scholarship (TFS)
Muchtar	Hadi	Materials Science funded Scholarship
Muddam	Swathi	Tuition Fee Scholarship (TFS)
Park	Hyunsik	Tuition Fee Scholarship (TFS)
Pham	Chau	Tuition Fee Scholarship (TFS)
Pham	Anh	Tuition Fee Scholarship (TFS)
Rider	Myca	Materials Science funded Scholarship
Rider	John	Science Faculty Completion Scholarships
Shamlaye	Karl	Tuition Fee Scholarship (TFS)
Shiozawa	Tomo	APA(I) - 2007+ LP grants
		Materials Science funded Scholarship
Simons	Hugh	Materials Science funded Scholarship
		Australian Postgraduate Award APA
Soatthiyanon	Niphaphun	IPRS stipend component
		IPRS - Tuition Fee Component
Sun	Weifu	Tuition Fee Scholarship (TFS)
		Materials Science funded Scholarship
Sundaram	Sankara	Materials Science - ARC funded Proposal KIT
Tang	Chi	Materials Science funded Scholarship
Tian	Ruoming	Tuition Fee Scholarship (TFS)
		Materials Science funded Scholarship
Tong	Zhenbo	Materials Science - ARC funded Proposal KIT
Tsai	Ping-Han	Materials Science funded Scholarship
Vasudevan	Rama	Materials Science funded Scholarship
Vasudevan	Rama	Australian Postgraduate Award APA
Walker	Julian	APA(I) - 2007+ LP grants
Wan	Xiaohan	Materials Science funded Scholarship
Wang	Mengxi	APA(I) - 2007+ LP grants
Wang	Xing	University International Postgraduate Award
		Particle Breakage Scholarship
Wang	Mengxi	Science Faculty Completion Scholarships
Wang	Xing	Particle Breakage Scholarship
Wang	Minghao	Materials Science funded Scholarship
Wen	Ru	Tuition Fee Scholarship (TFS)
Wu	Yun-Qi	Materials Science funded Scholarship
		Tuition Fee Scholarship (TFS)
Xia	Boshi	Materials Science funded Scholarship
Xing	Xing	Materials Science funded Scholarship
Xing	Mao	Materials Science funded Scholarship
Xiong	Shixian	Materials Science funded Scholarship
		University International Postgraduate Award
Xu	Wen	Tuition Fee Scholarship (TFS)
		Materials Science funded Scholarship
Xu	Menghua	Materials Science funded Scholarship
Yang	Si	Tuition Fee Scholarship (TFS)
Yang	Wenjing	Tuition Fee Scholarship (TFS)

Surname	First Name	Award Description
Yang	Xiaohong	Tuition Fee Scholarship (TFS)
Yang	Si	APA -International holder
Yang	Jun	Tuition Fee Scholarship- stipend component
		Materials Science funded Scholarship
Yang	Si	Materials Science funded Scholarship
Yang	Jun	Tuition Fee Scholarship (TFS)
Yao	Yin	Australian Postgraduate Award APA
Ye	Zhuozhu	Postgraduate Research Student Support (PRSS)
		Materials Science funded Scholarship
Yi	Liang	Tuition Fee Scholarship (TFS)
Yin	Huaying	APA(I) - 2007+ LP grants
		Materials Science funded Scholarship
Yong	Matthew	Materials Science funded Scholarship
Yue	Jeffrey	Materials Science funded Scholarship
Zakaria	Mohd	Materials Science funded Scholarship
Zhang	Jing	Materials Science funded Scholarship
Zhang	Yichi	Materials Science funded Scholarship
Zhang	Jing	Tuition Fee Scholarship (TFS)
Zhang	Zhengjie	Tuition Fee Scholarship (TFS)
Zhang	Qi	University International Postgraduate Award
Zhang	Zhengjie	Tuition Fee Scholarship (TFS)
Zhang	Huiming	Tuition Fee Scholarship (TFS)
Zheng	Qijun	Tuition Fee Scholarship (TFS)
		Materials Science funded Scholarship
Zheng	Benny	Materials Science funded Scholarship
Zhu	Beibei	Tuition Fee Scholarship (TFS)
		Materials Science funded Scholarship



Postgraduate Completions

Name	Degree	Supervisor
BERNTHALER, Timo	PhD	MH
CHUANG, Li-Pu (Kris)	PhD	SL
DAYAL, Pranesh	PhD	MH
DOWNIE, Adriana	PhD	PM
GUO, Wei (Gregory)	PhD	MF
HANAOR, Dorian Amir	PhD	CS
HOO, Rui Ping	PhD	MH
HOU, Qinfu	PhD	AY
IDRIS, Muhammad Asri (Asri)	PhD	SL
KONGKARAT, Somiyot (Nick)	PhD	VS
LAU, Kai Dick (KD)	ME	MF
LAU, Kok Tee (KT)	PhD	CS
LEE, Seung Jae (Michael)	ME	VS
LIU, Ning	ME	AY
LIU, Sida	ME	AY
LOTT, Oliver	PhD	MH
LUO, Zhenhua (Jerry)	PhD	MH
PHOTONGKAM, Pat	PhD	SL
SYED BAKAR, Sharifah	PhD	VS
TSAI, Ping Ju Ben (Ben)	PhD	SC
TSAI, Hank Ping Han (Hank)	PhD	SL
XIONG, Shi Xian (Danny)	MSc	XCJ
YANG, Jiangliang	PhD	SL
YANG, Ye	ME	SL
YIN, Huaying (Maggie)	PhD	DY
YUE, Yui On (Jeffrey)	PhD	XCJ
ZHANG, Huiming (Josh)	ME	AY
ZHANG, Yichi (Lawrence)	Mphil	MH


"UNSW's rankings confirm us as one of Australia's leading research-intensive universities. Our high-quality, real-world research combined with extensive industry partnerships ensure we make an impact nationally and around the globe." - UNSW Annual Report 2011

Research

Research

The School's research profile seeks to exploit the synergies between cutting edge science and high impact technological development. It is very proud of its ability to attract highly competitive basic research grants while at the same time being a partner of choice for key Australian and international companies. A perusal of the publications and research grants shows excellence in fields ranging from the fundamental physics of ferroelectric thin films to the optimisation of coal combustion in blast furnaces for steelmaking.

This diversity makes the School robust through provision of a structure which enables staff to contribute to new areas of research in the discipline while retaining close links to industry. Many staff bridge these foci with considerable success.

The School research is nominally divided into areas of core existing and developing strengths. There is overlap both between these areas and the activities of staff.

Core existing research areas:

Core existing research areas sustainable into the future	Areas for development and growth
1. Process Metallurgy	5. Energy Materials
2. Particle Science & Technology	6. Utilisation of Waste Materials
3. Advanced Functional and Structural Materials	7. Biomedical Materials
4. Physical Metallurgy	8. Nuclear Materials

The following research highlights provide a brief snapshot of some of the exciting research currently taking place in the School.

Relaxor Behaviour of Lead-free Ferroelectric Ceramics

H. Simons, J. Glaum, Y. Zhang,

M. Hoffman

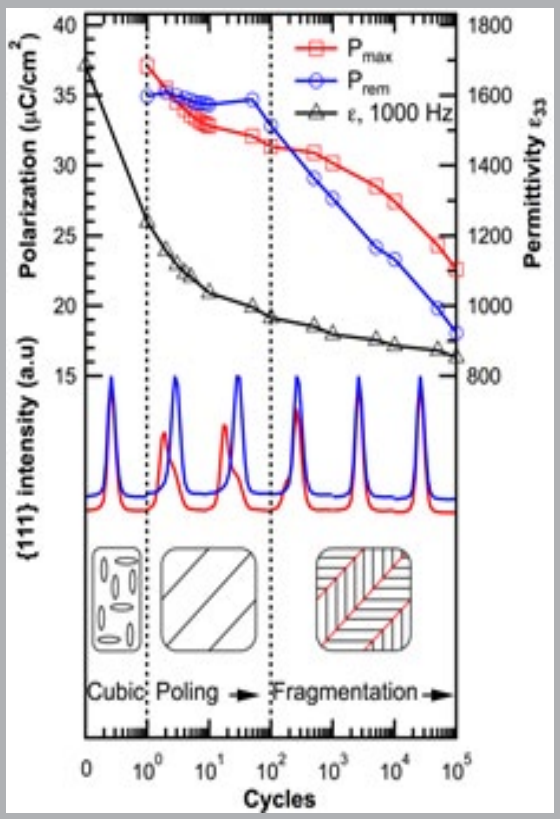
The characteristic, which makes piezoelectric materials so unique, is the ability to transform electrical power into mechanical strain and vice versa. This makes them suitable for a large number of every-day and high-tech applications, which spread from mobile phones to sonar systems. The class of materials which is most commonly used for these applications is lead-zirconate-titanate (PZT), as its performance is outstanding and it can be tuned over a broad range by the addition of dopants. The main drawback of PZT is that lead is toxic and harmful to the human body and the environment.

The search for sustainable lead-free piezoceramics over the recent years has led to the discovery of promising materials based on barium-titanate (BT) and bismuth-sodium-titanate (BNT). In these materials, a temperature dependent phase transition to the paraelectric state appears as a broad frequency-dependent maximum instead of a sharp first-order transition.

Additionally, an electric field induced phase transition was discovered for some of the compounds. These features give rise to the assumption, that many BNT- and BT-based materials are relaxors. This means they exhibit polar nanostructures within a paraelectric matrix, which are fluctuating at high temperatures and transfer to a glass-like state, when the temperature is lowered. Upon application of an electric field, they can be transferred into a ferroelectric state, which then exhibits the properties desired in applications.

The strong dependency of the crystal structure and by this the ferroelectric properties on electric field application enforces a new approach to clarify the relationship between the recently reported phase transition, the relaxor-like behavior and the ferroelectric properties. Our project approaches this topic by combining macroscopic (sample size scale) and mesoscopic (domain size scale) investigations with in-situ neutron scattering (unit cell scale).

A recent study on BNT-6%BT has shown that the application of a bipolar electric field transfers the materials from the relaxor state to a ferroelectric state within the first few cycles. Upon further cycling the domain size decreases until they become too small to be resolved in the neutron patterns. At the same time the macroscopic properties, polarization and permittivity, decrease continuously, indicating that the material fatigues. These results suggest that a new mechanism is present, which has never been observed in PZT. It can be explained by a combined process of continuous domain wall pinning by internal defects and fragmentation of domains to accommodate the applied electric field.



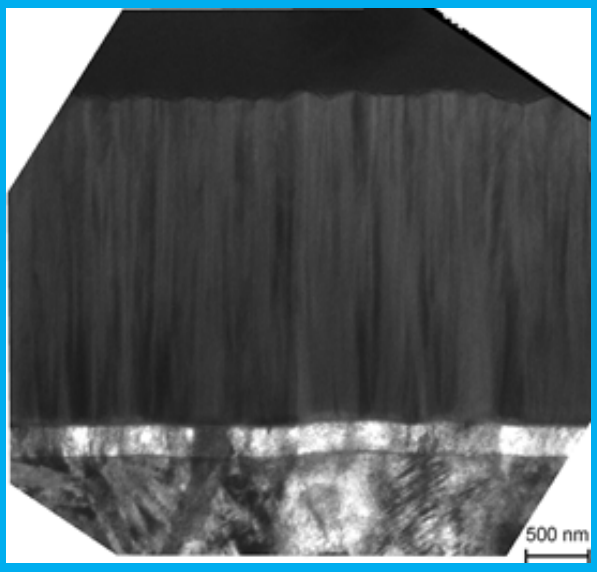
Microstructural Analysis of CrNiN-based thin Films

Paul Munroe, Amy Wo and Zong-Han Xie[1]
[1] School of Engineering, Edith Cowan University.

Nitride-based thin films, such as those based on TiN and CrN, are routinely applied to steel substrates to improve wear resistance for applications in areas such as tooling and machining. In this study we have investigated the behaviour of CrNiN thin films. In these materials Ni is used to replace Cr as it is hypothesized that Ni additions may improve thermal conductivity relative to binary CrN and reduce the thermal expansion mismatch between steel, which is commonly used as a substrate, and the CrN-based thin film. Further, it is expected that Ni addition may enhance the corrosion and oxidation resistance of CrN.

In this study CrNiN coatings, with differing Ni contents, were deposited onto AISI M2 steel substrates using a closed field unbalanced magnetron sputtering system. These were examined by focused ion beam microscopy, transmission electron microscopy and nanoindentation testing. The coatings were typically about 2 2̃m in thickness. It was found that increasing the Ni:Cr ratio in the coating significantly changed the microstructure of the films, such that at the highest Ni concentrations, ~ 25at.%, the grains become highly elongated in the direction of growth. As the Ni content increased the aspect ratio of the grains increased from ~ 10:1 in the binary coating to ~ 50:1.

Ni additions to CrN were found to very slightly reduce the coating hardness. However, the deformation mechanisms were found to change as the aspect ratio of the grains increased with increasing Ni content. In the binary coating, cracks were found to propagate readily along columnar grain boundaries, leading to coating fracture and failure. However, in the high Ni-containing coatings the grain cohesion appeared to increase and columnar cracking was not observed, in spite of the greater alignment of the grains. Instead, a small number of transgranular cracks were noted to run perpendicular to the loading direction. This led to increases in the toughness and coating damage resistance.



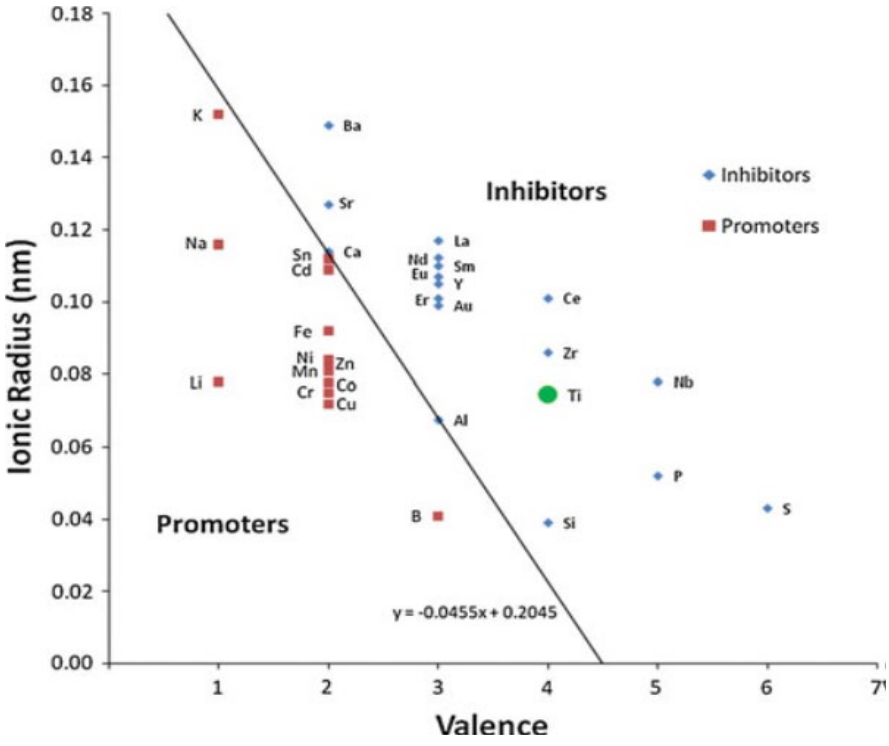
Bright field TEM image of a CrNiN coating with ~25at%Ni. Note the highly elongated grains.

Review of the Anatase to Rutile Phase Transformation

Dorian Hanaor and Chris Sorrell

The research group has been focussing on novel methods of altering the properties of doped semiconducting oxides for photocatalytic applications in water photolysis, water and air purification, and self-cleaning and self-sterilising coatings. Part of this work entailed the preparation of a major review of the polymorphs of TiO2. Although this particular work was not experimental, it was distinctive in that it provided a predictive method for determining whether or not a particular dopant would be likely to promote or inhibit the anatase > rutile phase transformation.

The basis for this formalisation was the determination that this phenomenon is based on simple crystal chemical considerations, as shown in the figure. This principle then was applied to the entire Periodic Table as a guide for the researcher. This work was voted the most outstanding paper in the Journal of Materials Science for the month of February 2011, which entered it into the final 12 papers considered for the award of the Sapphire Prize of US$10,000. Although the paper did not win, it has been downloaded 300 to 400 times per month, making it the most downloaded paper of the 971 published by this journal in 2011 and the third most frequently downloaded of the journal's database covering 46 years.



Powder metallurgy aluminium composites with high volume of silicon carbide reinforcements

Sammy Chan

Composite materials are particular advantageous in that they offer a combination of properties which cannot be obtained from individual constituents. The light-weight aluminium matrix composites (AMCs) not only have a high specific strength and stiffness, they can also be tailored made to suit a particular application. However, the properties of AMCs vary greatly on the selection of raw materials and their fabrication technique. In many cases, local heterogeneity in the structure of the composites can degrade their properties and performance. This is particularly true for AMCs with high volume fractions of reinforcements. Aluminium composites with more than 20 volume fraction reinforcements were difficult to process. Significant amount of surface cracking and internal defects are often observed during secondary extrusion and rolling processes.

In our work, we have successfully fabricated aluminium composites with very high volume fractions of silicon carbide, using a modified powder metallurgy technique.Particular attention has been paid to the extrusion lubricant used, so as to avoid extrusion defects commonly found in extrusion of high strength metals. This method is relatively simple and does not require expensive raw material. It is also easy to upscale and most importantly produces composites with reasonably homogenous structure. Composites with as much as 30 volume fraction of silicon carbide particles have been produced, which have been found to have exceptionally high abrasion resistance.
Analysis using electron and optical microscopy has indicated that the dispersion of the reinforcement particles was homogenous throughout the composite material. Mechanical testing has shown that the addition of reinforcement particles significantly improved the hardness, stiffness and strength of the composite, with only slight increase in overall weight. Generally, for every 10 volume fraction of silicon carbide reinforcement added, a corresponding 20% improvement in strength and stiffness was achieved.

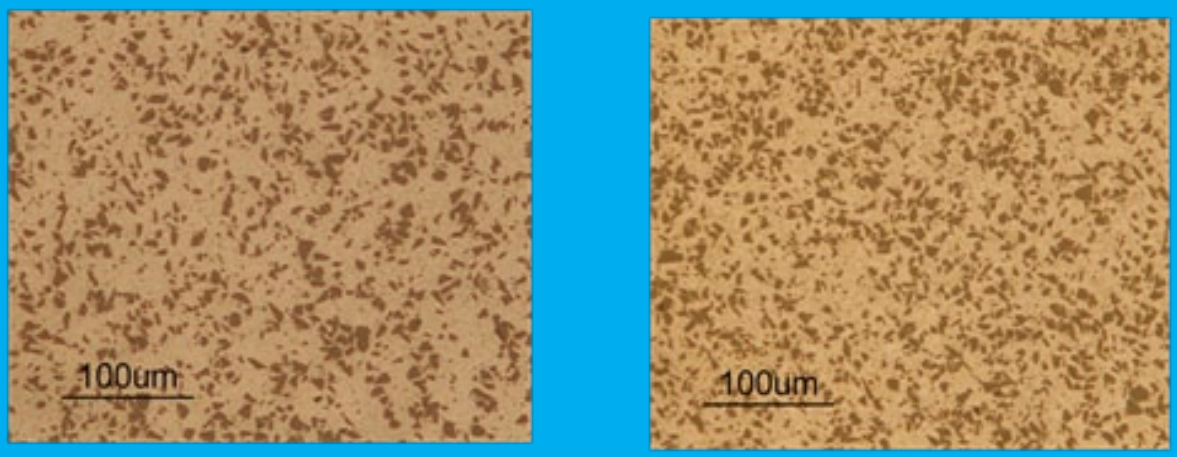


Figure 1 Optical of aluminium composite reinforced with 20 (left) and 30 (right) volume fraction silicon carbide.

Rietveld refinement analysis of in-situ thermal dehydrogenation of titanium hydride powder

Sammy Chan, Yin Yao

Composite materials are particular advantageous in that they offer a combination of properties which cannot be obtained from individual constituents. The light-weight aluminium matrix composites (AMCs) not only have a high specific strength and stiffness, they can also be tailored made to suit a particular application. However, the properties of AMCs vary greatly on the selection of raw materials and their fabrication technique. In many cases, local heterogeneity in the structure of the composites can degrade their properties and performance. This is particularly true for AMCs with high volume fractions of reinforcements. Aluminium composites with more than 20 volume fraction reinforcements were difficult to process. Significant amount of surface cracking and internal defects are often observed during secondary extrusion and rolling processes.

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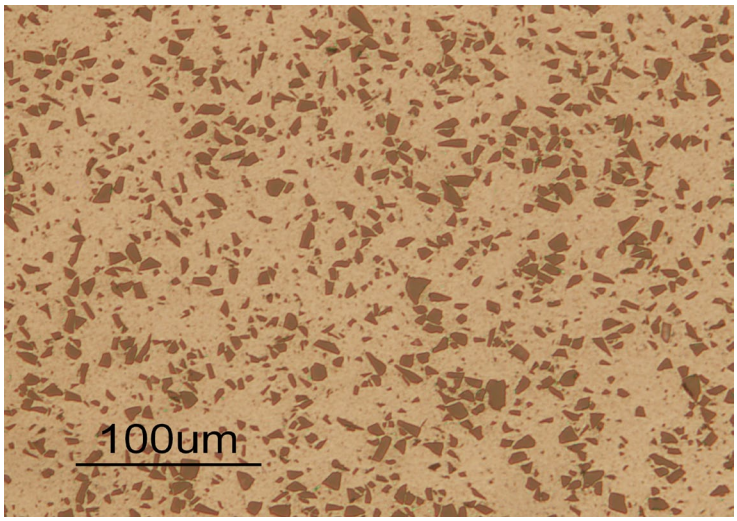


Figure 1 Optical of the reinforced aluminium composite.

Study of nano-indentation depth and flow behaviour of soft metal vs soft polymer

Sagar T Cholake,
S. Bandyopadhyay, Mykanth
R Mada, Ramakant Kumar,
Philip Boughton

Nano-indentation with precision displacement changes was used to study the changes observed in the measurement of reduced elastic modulus and hardness of soft metal, copper and soft polymer, LDPE. Creep phenomenon was observed during the holding time also called dwell time. This affects the measurement in indenter depth causing subsequent errors in hardness measurement. Indentations were made in three different steps with a Berkovich indenter. In the first step the applied maximum load was varied from 500 μN to 2500 μN keeping loading rate at 50 μN/sec and dwelling time 5 sec as constant. In the second step the dwelling time was varied from 5 sec to 30 sec keeping applied maximum load at 2500 μN and loading rate at 50 μN/sec as constant. In the third step the loading rate was changed from 5 μN/sec to 150 μN/sec maintaining the applied load at 2500 μN and holding time 5 sec as constant. In the first two cases when applied load and holding time were changing the hardness and reduced modulus were decreasing which shows that applied load and holding time are inversely proportional to hardness and reduced modulus. In the third case when loading rate was increased at constant maximum load and constant holding time the reduced modulus and hardness were increasing proportionately with the holding rate. The paper analyses the possible mechanisms involved in such phenomena. See figure 1 for some summarised results on copper and polymer.

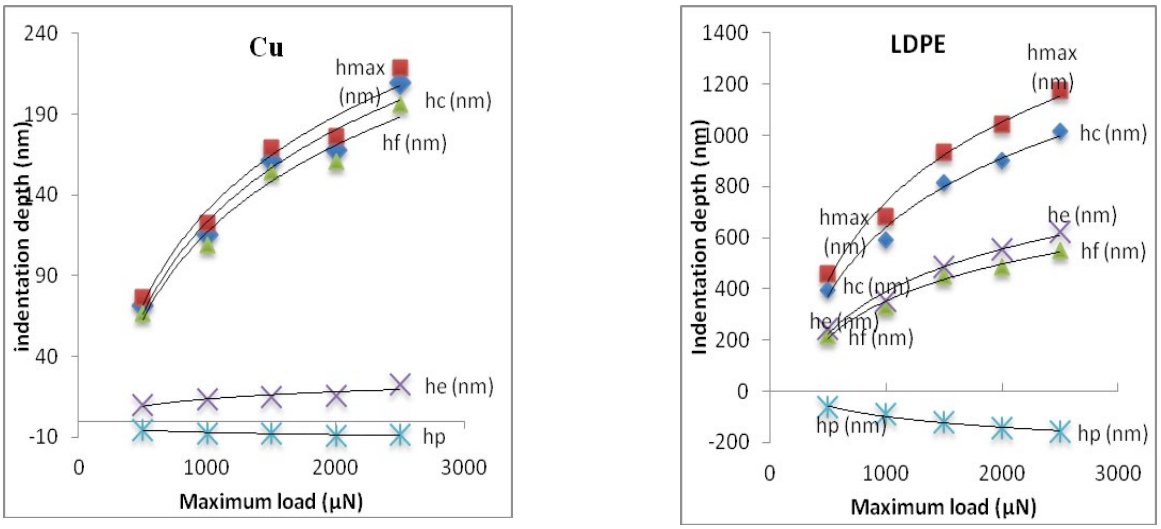


Figure 1 : Change in indentation depth in copper and polymer

In-situ stress and strain measurements around cracks using synchrotron X-ray diffraction

John Daniels

Fracture mechanics is an important part of materials science and engineering. Generally speaking, it is concerned with the nucleation and growth of cracks within materials. This is of interest to virtually all aspects of engineering, where the accumulation of damage plays an important role in the performance of the component, ranging from microelectronic devices to large aircraft and heavy-duty components in power stations. From an engineering point of view it is of paramount importance to understand the failure mechanism of materials, and then implement this understanding in the design of components in order to predict their lifetime and ensure their safe operation.

In a review article for The Journal of Strain Analysis for Engineering Design [1], Dr John Daniels from the School, and a colleague from the European Spallation Neutron Source, outlined the current state of the art in the use of high-energy synchrotron x-ray scattering techniques for the measurement of strain distributions within partially fractured materials. Several examples were given, including one from Daniels' own research group, where a functional electro-ceramic material containing a fracture was subject to its operational driving electric fields. The strain and texture distributions were mapped using monochromatic high-energy synchrotron radiation (Figure 1).

The article demonstrated that crack tip stress determination has made great advances in the last decade, and can now provide valuable input for engineering understanding of crack growth and material failure phenomena. The penetration capabilities and brightness of synchrotron X-rays makes them an ideal tool for the study of crack growth in bulk samples, even in-situ and with the ability to map the strains within very small areas around the crack tip.

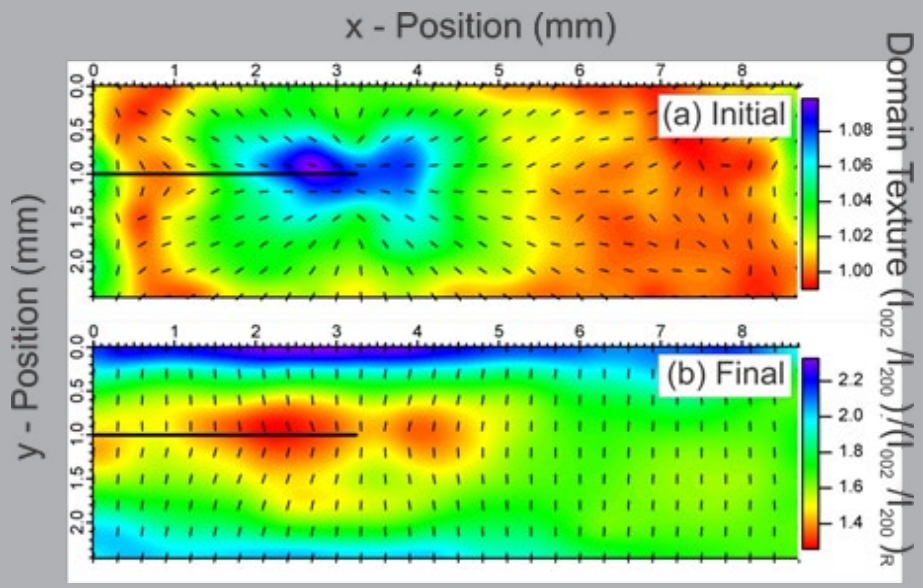


Figure 1. Tetragonal domain texture variations in a functional ceramic around an induced crack: (a) in the as-annealed sample; (b) after electrical poling in the vertical direction. Note the difference in scale between (a) and (b).

Cyclic oxidation resistance of nano-crystalline 304 stainless steel

Jianqiang Zhang, David J. Young

It has long been recognised that refining the grain structure of an alloy can promote selective oxidation of its aluminum and/or chromium content. This promotion effect becomes more significant when alloy grain sizes are reduced below about 100 nm. The effect is attributed to rapid diffusion of Al and/or Cr through the grain boundaries, which increases significantly the effective Al and/or Cr diffusion coefficient, and thereby reduces the critical aluminum/chromium concentration required for external alumina/chromia scale formation.

Another advantage of nano-crystalline materials is that their oxide scales show superior resistance to cracking and spallation. Cyclic and long-term oxidation resistance has been significantly improved by applying nano-crystalline coatings. In addition, the oxides formed on nano- and submicro-crystalline coatings are pegged onto the metal grain boundaries to form a convoluted interface. The so-called "micro-pegging" effect of the inward-grown oxides results in better scale adhesion to the metal substrate.

Type 304 stainless steel exhibits good oxidation resistance at moderately high temperatures because of its ability to form a protective chromia scale at the alloy surface. However, the internal precipitation of chromium-rich compounds and repeated cycles of selective Cr2O3 scale formation and spallation reduce the chromium concentration at the alloy surface to lower levels than that of the bulk alloy. When the protective chromia oxide scale fails and cannot reheal because of chromium depletion, the alloy is susceptible to formation of a non-protective Fe-rich oxide scale. In this case, breakaway oxidation occurs. It has been reported that water vapour and cyclic reaction accelerate the onset of breakaway oxidation.

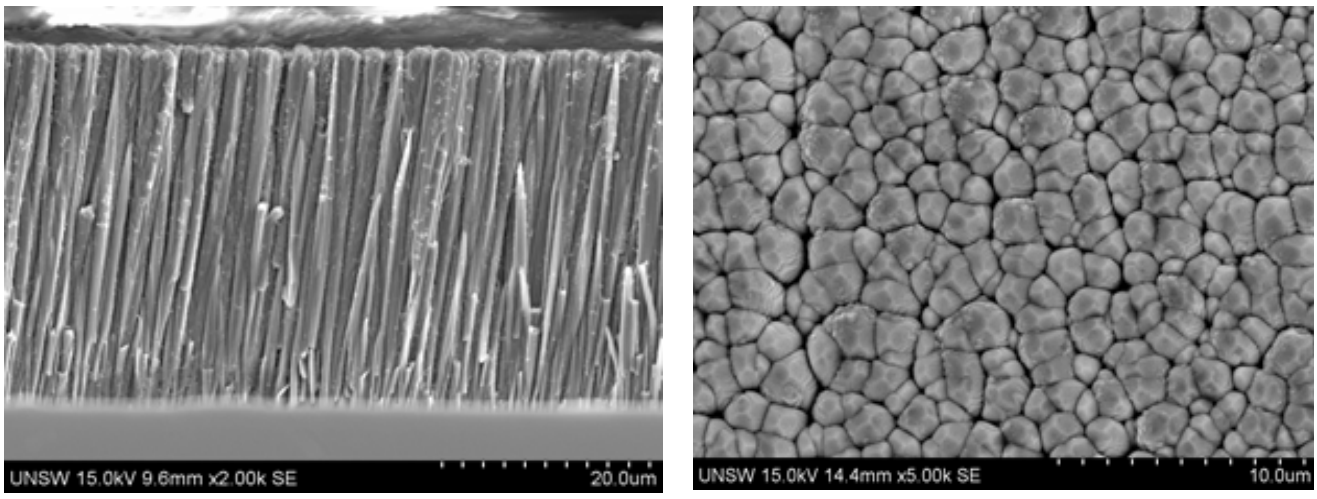
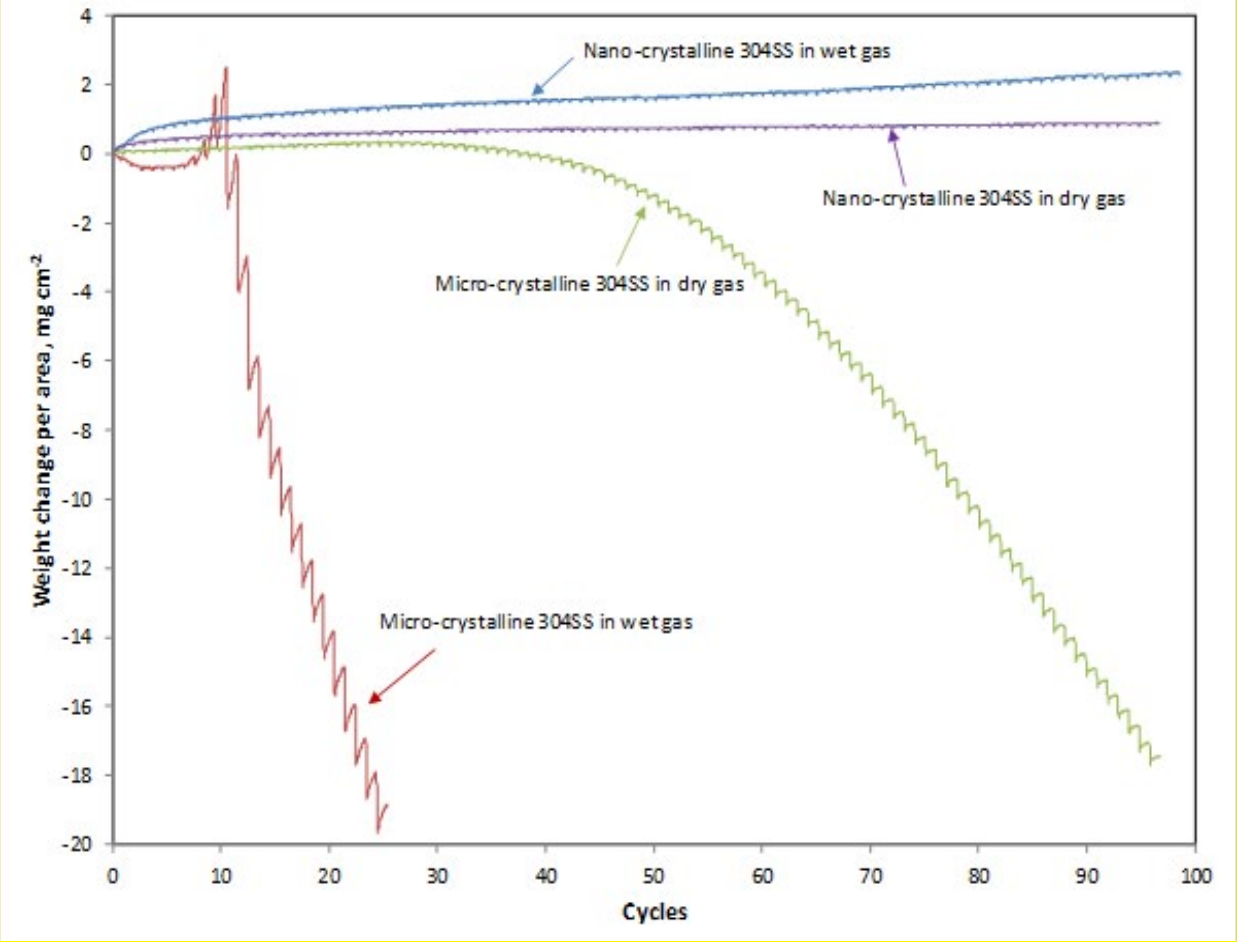


Fig. 1. SEM observations of (a) cross-section and (b) top-view of the nano-coated structure.

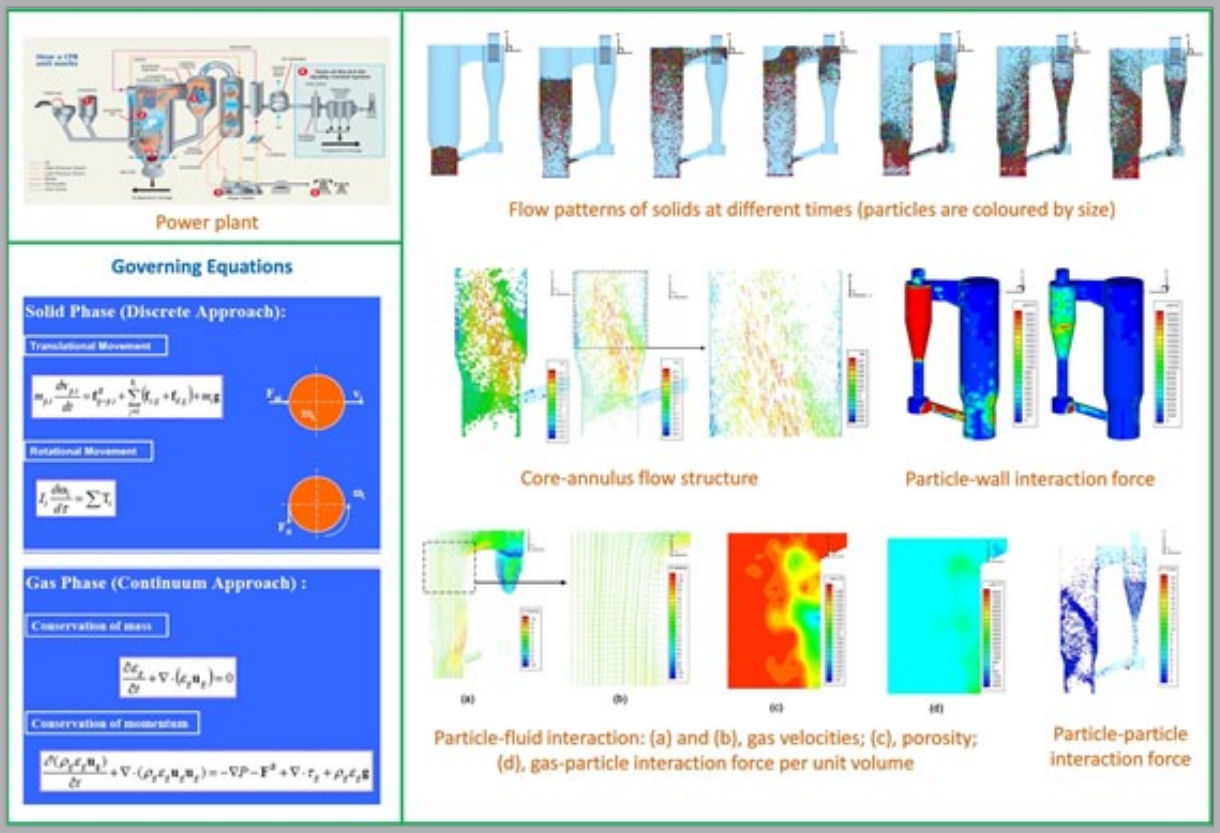
The present work was intended to provide information on the oxidation of nano-crystalline 304 stainless steel under cyclic reaction conditions (50 min at reaction temperature and 10 min at ambient) in both dry and wet air at 900°C. The nanocrystalline alloys were prepared as coatings, by means of direct current magnetron sputtering (DCMS). The target alloy composition for coating was selected to be the same as that of the 304SS substrate to avoid inter-diffusion and reduce thermal stress between coating and substrate.
Nano-crystalline coatings prepared by DCMS develop in the form of columnar crystallites oriented in the deposition direction. The typical coating structure is shown in the fracture cross-section in Fig. 1a, and Fig. 1b shows a top view of these packed columns. The grain size normal to the deposition direction is in the range of 5-20 nm. Figure 2 shows the weight change kinetics of micro- and nano-crystalline 304SS reacted at 900°C, in dry and wet air. Obvious spallation was observed for micro-crystalline 304SS in both dry and wet air, indicating the onset of breakaway oxidation. For nano-crystalline 304SS, however, a dense and continuous chromium oxide layer was formed at the surface. No apparent spallation was observed for nano-crystalline alloy in either gas (Fig. 2). It is therefore concluded that nano-crystalline structure promotes the formation of protective chromium oxide. Reducing the grain size to nano-scale produces a significant increase in grain boundaries which accelerate the diffusion of Cr, and therefore reduces the critical chromium concentration for protective chromia formation, according to Wagner's theory. The survival of nano-alloy in the wet gas can be attributed to the fast regrowth of chromium oxide due to the fine nano-structure, which reduces the negative effect of water vapour.



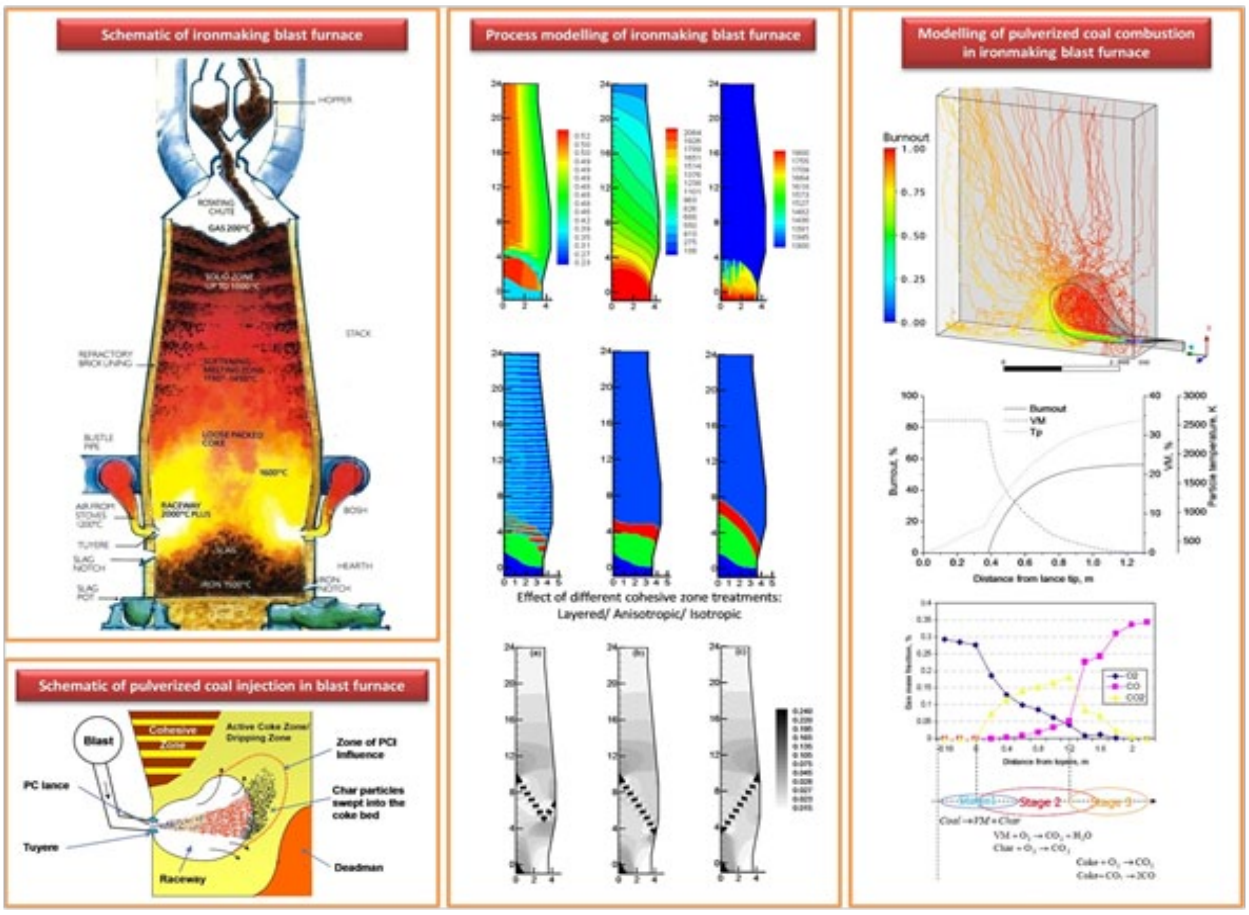
Highlights of Representative Research Projects at SIMPAS

The research conducted at the Laboratory for Simulation and Modelling of Particulate Systems (SIMPAS), led by Aibing Yu, Federation Fellow and Scientia Professor, aims to understand and model the physics governing particulate and multiphase processing, with its application oriented to mineral/metallurgical/material/chemical industries. Over years SIMPAS has developed a sustained and systematic way to study particulate matter at various time and length scales including, for example, the determination of contact forces between particles at an atomic or sub-particle scale, dynamics of particles at a particle scale, and performance of an operational unit at a process equipment scale. The outcomes of his research include theories, computer models and simulation techniques, and knowledge at both microscopic and macroscopic levels. Such mutltiscale research is critical to advancing particle science and technology, as well as process technology. Below are a few examples highlighting SIMPAS work.

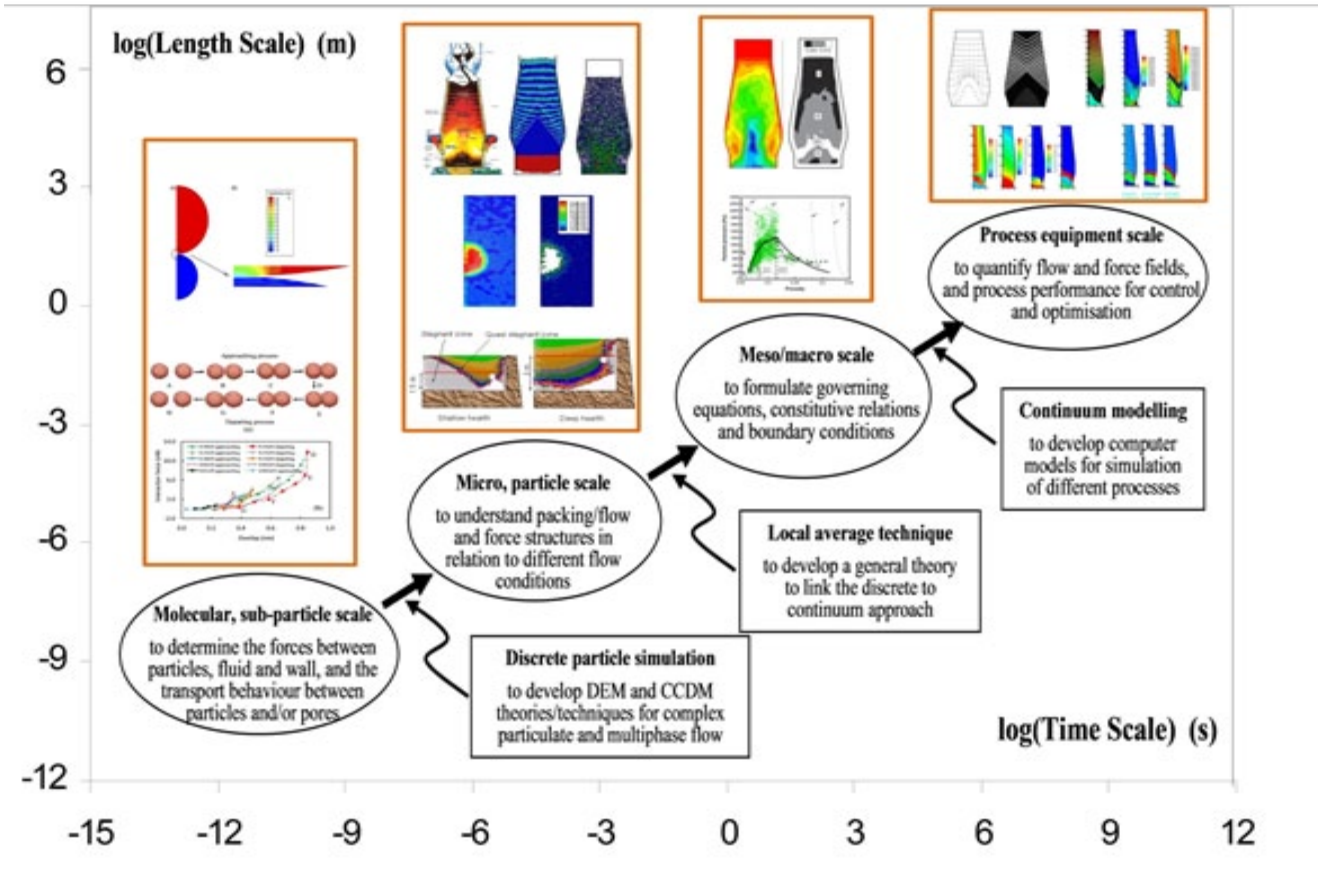
Discrete particle modelling and analysis of complex particle-fluid flows



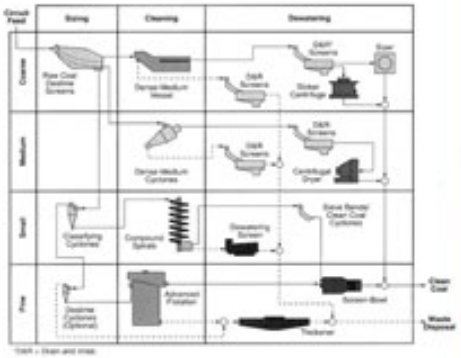
Multiscale modelling of the transport phenomena in ironmaking blast furnace



Granular dynamics: theories, modelling and simulation

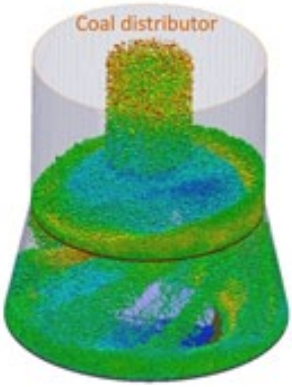


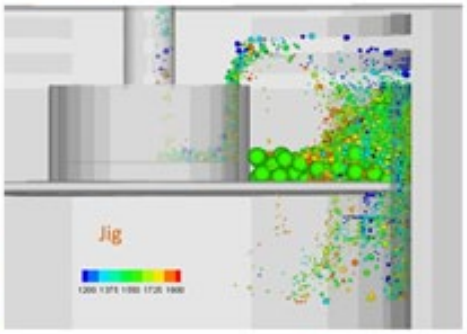
Particle scale modelling and analysis of the multiphase flows in coal preparation

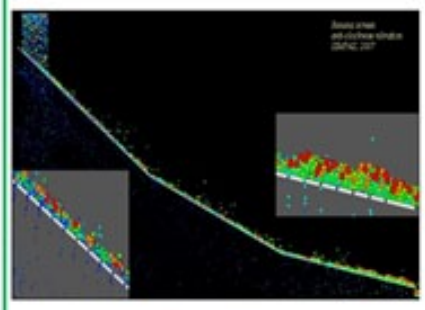


Function of the key operations/processes in a coal preparation plant

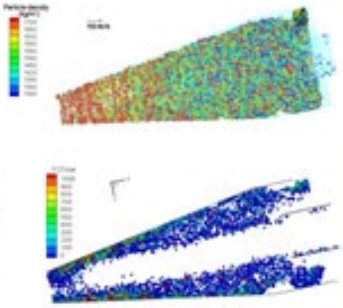
Typical Results







Screening



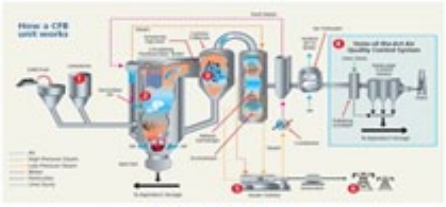
Dense medium cyclone

Multiscale modelling and analysis of complex particulate and multiphase flow

Typical Particulate Multiphase Flows

Oil refineries

Drug inhalers



Power plant

Governing Equations

Particle flow

$$I_i \frac{d\boldsymbol{\omega}_i}{dt} = \sum_{j=1}^{k_c} \left(\boldsymbol{T}_{c,ij} + \boldsymbol{T}_{r,ij} \right)$$

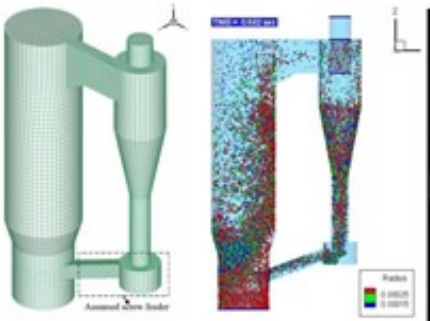
$$m_i \frac{d\boldsymbol{v}_i}{dt} = \boldsymbol{f}_{pf,i} + m_i \boldsymbol{g} + \sum_{j=1}^{k_c} \left(\boldsymbol{f}_{c,ij} + \boldsymbol{f}_{d,ij} + \boldsymbol{f}_{v,ij} \right)$$

Fluid flow

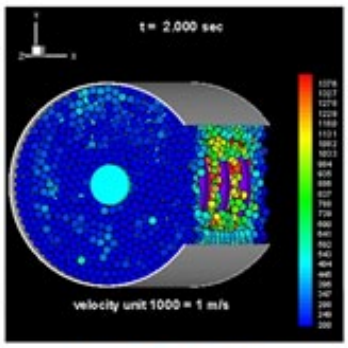
$$\frac{\partial \varepsilon}{\partial t} + \nabla \cdot (\varepsilon \mathbf{u}) = 0$$

$$\frac{\partial (\rho_f \varepsilon \mathbf{u})}{\partial t} + \nabla \cdot (\rho_f \varepsilon \mathbf{u}\mathbf{u}) = -\nabla \mathbf{p} - \mathbf{F}_{sf} + \nabla \cdot (\varepsilon \boldsymbol{\tau}) + \rho_f \varepsilon \mathbf{g}$$

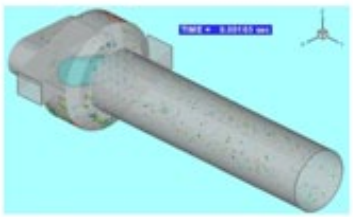
Typical Results



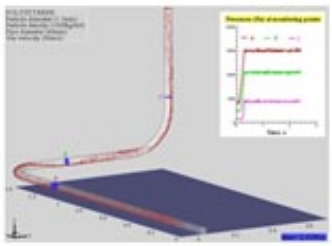
A full loop of a circulating fluidized bed (left: mesh; right: solids flow pattern)



Particle flow in an Isamill



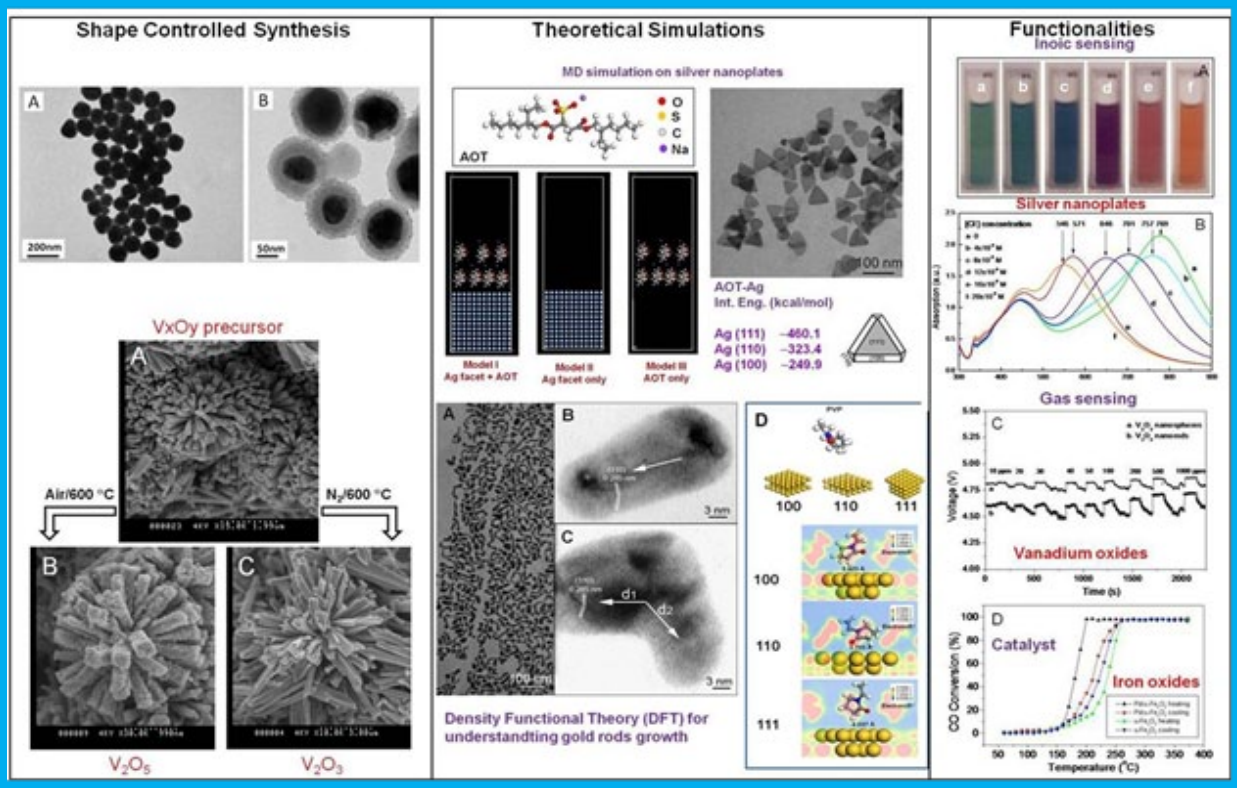
The dispersion of drug agglomerates in a drug inhaler



Pneumatic conveying process

The slug flow pattern in a horizontal pneumatic conveying pipe

Nanoparticles: Synthesis and Applications



Immobilization of Na Ions for Substantial Power Factor Enhancement: Site-Specific Defect Engineering in $Na_{0.8}CoO_2$

Sean Li

Simultaneous enhancement of the interdependent Seebeck coefficient and electrical conductivity has been achieved through defect engineering by doping Mg into specific sites of Na0.8CoO2. Results from thermoelectric measurement demonstrate that the power factor was substantially increased by 50% at ambient (Figure 1). Experimental and theoretical analyses show that the occupation of divalent Mg in the disordered Na layer immobilizes the Na ions, thus induces a long-range ordering of Na ions (Figure 2). This phenomenon improves the carrier mobility significantly, giving rise to the observed exotic thermoelectric performance. Moreover, it is predicted that other electronically closed-shell dopants in sodium cobaltate play a similar role in enhancing the thermoelectric conversion efficiency.

Figure 1

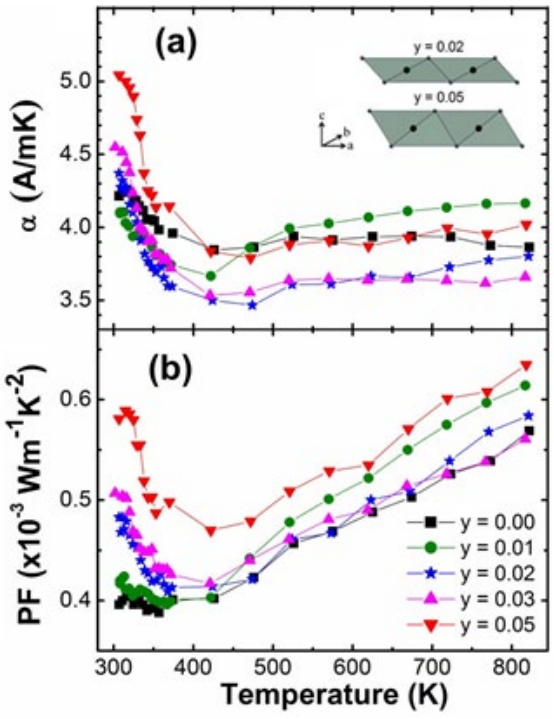


Figure 2

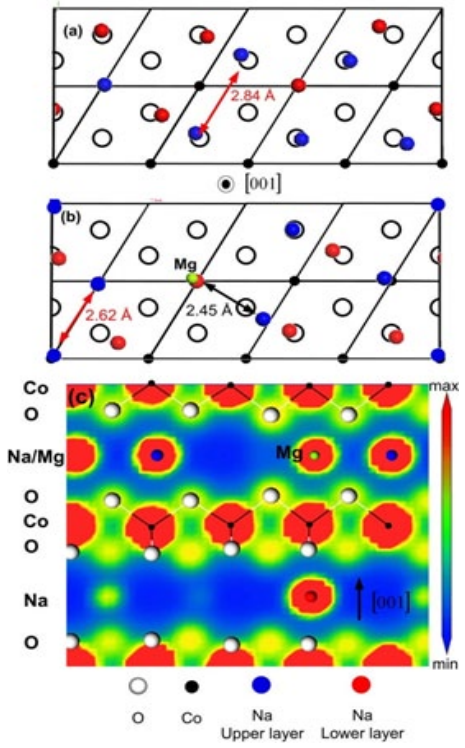


Figure (a) Temperature dependence of Peltier conductivity for Na0.8CoO2:Mgy. The inset shows the schematic drawing of two edge-sharing CoO6 units for y = 0.02 and y = 0.05 samples. (b) Power factor (PF) as a function of temperature for Na0.8CoO2:Mgy.

Figure 2 (a) The positions of the Na+ ions in the supercell for the Na0.75CoO2 system and (b) the positions of the Mg2+ ion (the green ball) and the Na+ ions in the supercell for the Na0.75CoO2:Mgl system are presented. (c) The charge density of the cobalt oxide layer vertical to the Na/Mg layer is presented. Charge density field's minimum (maximum) value is 0 e/Å3 (0.125 e/Å3). The green ball denotes Mg.

Strength, Micro-strength and Microstructure of Carbonaceous Materials

Xing Xing, PhD student*
Oleg Ostrovski

Modern ferrous metallurgy is based on the use of carbonaceous materials. Decrease in coke/char consumption is among major directions in improving efficiency of metallurgical industry and decrease in greenhouse gas emission. This drives intensive research in properties of carbonaceous materials.

The aim of my project is to establish the effect of heating of carbonaceous materials on their mechanical strength and understanding of factors affecting mechanical strength. The project studies a number of cokes, chars and coals which are used in Tasmanian Electrometallurgical Company and Metalloys (South Africa).

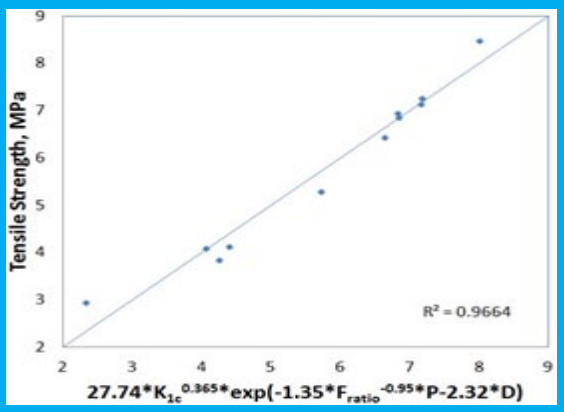
Carbonaceous materials have high porosity. The mechanical strength of carbonaceous materials is dependent on the porosity and porous geometry, structure and micro-strength of walls, which frame the porous.

Mechanical strength was studied by the tensile and tumbling tests; porosity and porous geometry were examined by the optical image analysis; microstructure was studied using XRD and Raman spectroscopy; micro-strength was examined using micro-indentation measurement.

The following relationship was established to characterize effects of micro-strength K1c, porosity P and pores geometry (equivalent circle diameter of pores D and Feret ratio Fratio) on the tensile strength of carbonaceous materials T:

T=aK1c^b*exp(cFratio^d*P-eD)

where a, b, c, d and e are fitting constants. Figure below shows good correlation between experimental and calculated tensile strength.



Mechanical strength of coals and chars had 16-40% increase upon heating, while mechanical strength of cokes degraded by approximately 9 %. Different trends in the effect of heating on mechanical strength carbonaceous materials were explained by differences in micro-strength, porosity and pore.

* At the School of Mechanical Engineering, University of Adelaide

DEM study of the transverse mixing of wet particles in rotating drums

P.Y. Liu, R.Y. Yang and A.B. Yu

Rotating drums partially filled with particles are widely used in industry for mixing, granulation, grinding and calcinations. Particle flows inside drums exhibit very complicated patterns, such as various flow regimes, avalanching, mixing and segregation. Understanding these phenomena is important to both engineering processes and fundamental research of granular flow. This work presents a numerical study of the mixing of wet particles in a rotating drum. The effects of the liquid surface tension, drum rotation speed and filling level on particle mixing are investigated. The results show that particles have quick mixing in the transverse plane and the well mixed states are achieved within a few revolutions. The Lacey mixing index shows an exponential increase with mixing time. The presence of the capillary force in general reduces mixing performance. The analysis of particle movements indicates that particle mixing is dominated by the particle circulation period, which is the time required for a particle to complete one circulation in the drum, and its standard deviation. A model is proposed to estimate the circulation periods at different streamlines which are comparable with the simulation results, thus providing a general method to predict mixing performance in the transverse plane.

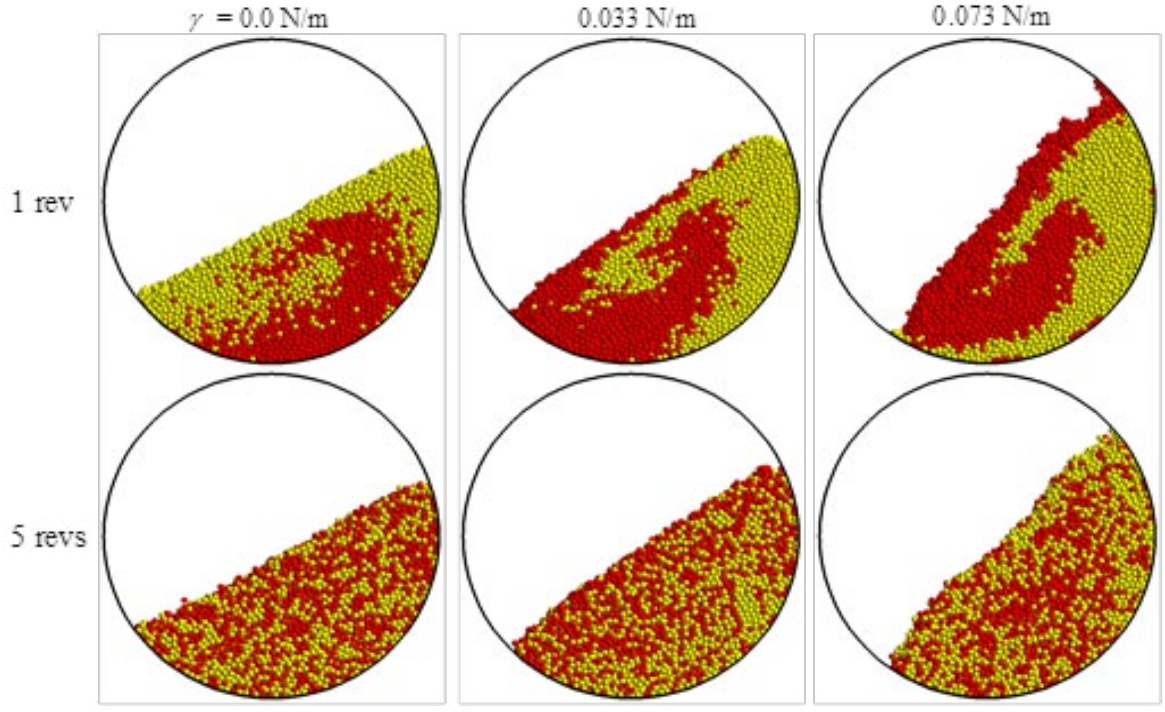


Fig.1. Evolution of mixing patterns with different surface tensions. f = 40% and Ω =15 rpm.

Room temperature ferromagnetism in Teflon due to carbon dangling bonds

Jiabao Yi

Defects inducing ferromagnetism has been a critical issue in the research of magnetic semiconductors. The ferromagnetism in many oxide based diluted magnetic semiconductors have been proved to be due to the defects. On the other hand, defects can be used to produce and engineer ferromagnetism, which has been proved successful in oxide based materials. People may wonder whether these defects engineering can be used in polymer. In the present project, we used simple stretching and cutting to induce room temperature ferromagnetism in Teflon, as well as other polymers. Detail experiments and theoretical works have shown that the room temperature ferromagnetism is due to the two dimensional electron gas (2DEG) formed by the dangling bonds inducing by cutting or stretching. The work has indicated that room temperature ferromagnetism can be created in polymer and the ferromagnetism can be manipulated by defects engineering, which is of importance for spintronics and molecular magnets.

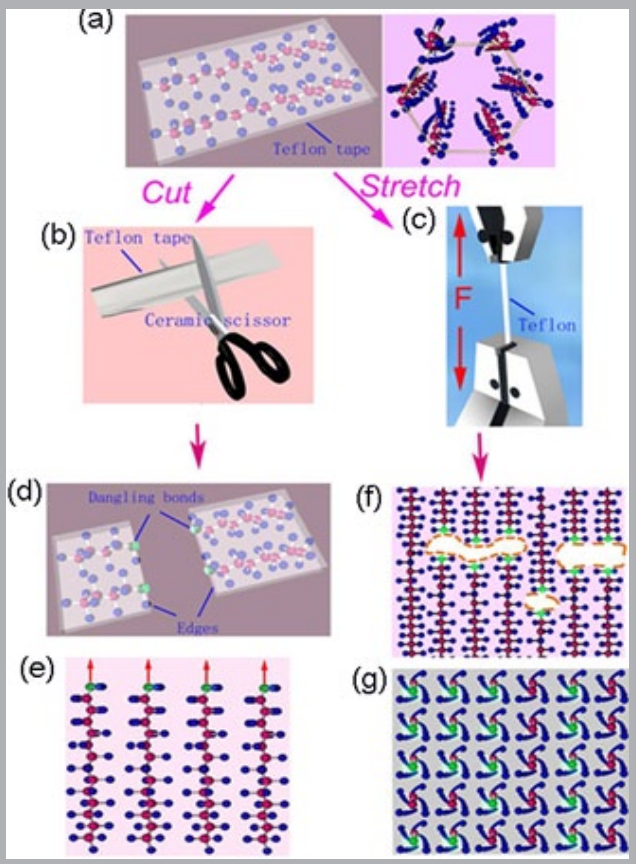


Figure 1. Description of experimental procedure (a) Teflon structure; (b) cutting; (c) stretching; (d) Formation of dangling bond; (e) Side view of 2D dangling bond and magnetic moments; (f)Dangling bond formed by stretching;

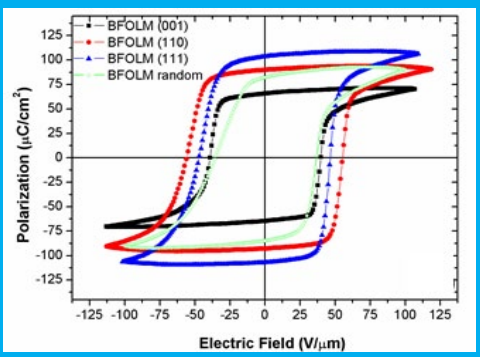
Recent Progress on Bismuth based Lead-free Ferroelectric / Piezoelectric Thin Films

Danyang Wang and
Rui Ding

A fatal drawback in today's Pb(Zr,Ti)O3 (PZT) technology is that it fully relies on the 60%-toxic lead content, which may cause severe environmental and human health problems. Thus, interest is high for development of novel ferroelectric/ piezoelectric materials that are lead-free. In spite of this concern, suitable lead-free replacement, particularly in thin film form, exhibiting properties comparable to those of PZT has not been found yet. The excellent ferroelectricity and piezoelectricity of lead containing oxides are originated from both high polarizability (large radius and a high effective number of electrons) and a lone electron pair in the outer shell of Pb, which could hybridized with oxygen ions. One of the elements that meets both requirements is bismuth. In addition, bismuth is a non-toxic heavy metal that has practically no harmful effects on environment and living organisms. From these points of view, bismuth based compounds thus seem to be the most likely successors to PZT.

Our recent efforts have been focused on growth and engineering physical properties of bismuth-based lead-free ferroelectric/piezoelectric oxide thin films. High quality thin films of cation-modified (Bi, Na)TiO3 [BNT] and BiFeO3 [BFO] were epitaxially grown on single crystal substrates using pulsed laser deposition. Impact of site and orientational engineering with respect to the physical properties of BNT and BFO-based thin films were investigated. It is found that pronounced ferroelectricity and piezoelectricity can be achieved in BNT-based films by selection of appropriate dopants. Substantial enhancement of the abovementioned properties has been obtained in La+Ce co-modified films with a piezoelectric coefficient d33,f of 70 pm/V, whereas Mn doping seems more favourite to reduce the leakage current by two order of magnitude. The doped BNT thin films exhibit diode-like I-V characteristics, which are correlated with resistance switching effect. A bismuth ferrite composition is also introduced with particular emphasis on its crystallographic anisotropy of multiferroism. The experimental results reveal that the crystallographic orientation is the critical factor that dominates the structural and multiferroic properties. Giant remanent polarization for differently oriented films was demonstrated at room temperature as shown in Fig 1. Saturated magnetization is also significantly dependent on film orientation, implying that epitaxial BFO thin films possess an easy magnetic axis rather than the easy plane predicted for bulk counterparts. The variation in leakage current density and ferroelectric coercivity were ascribed to the substantially difference of ferroelectric domain structures in variously oriented BFO thin films (Fig 2). Although the lead-free thin films do not match the overall performance of PZT yet, the advances of bismuth based thin films give well-founded hope that they are able to serve as environmentally-friendly and biocompatible non-volatile memories and piezoelectric devices in near future.

Fig. 1 Comparison of P-E hysteresis loops for differently oriented BFO based thin films



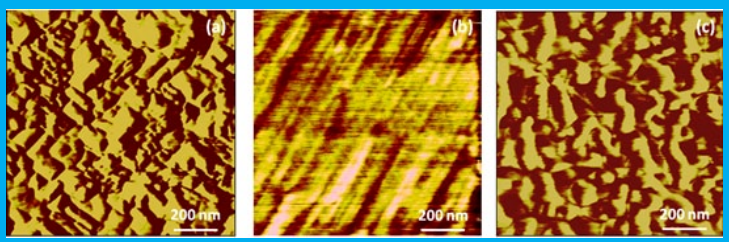


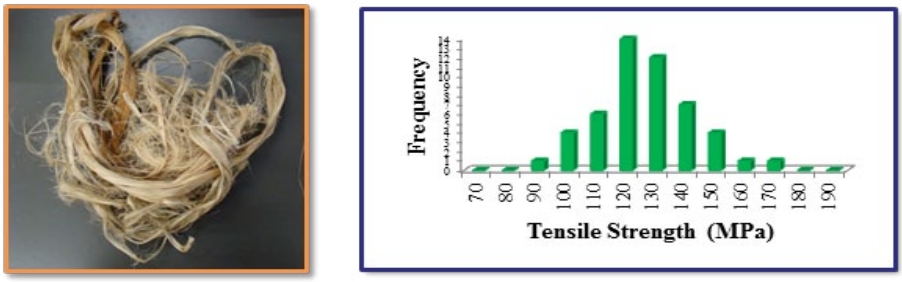
Fig. 2 Piezoelectric force microscopy images of (a) [001] (b) [110] (c) [111]-oriented BFO-based thin films.

Development of Design Guidelines for Natural Fibre Composites

Mindy Loo, Paresh Parmar, Alan Crosky and Andrew Beehag

Natural plant fibres are attractive for use in fibre reinforced plastic composites because of their low environmental impact. However they show a high level of variability which is reflected in their composites. Similar variability is observed in timber and this has been addressed in the construction industry by developing guidelines for its use as a building material in structural engineering. It is considered that a similar approach could be used for natural fibre composites.
As in the guidelines for timber, natural fibres would undergo a grading process by which they are sorted into groups with ideally, similar properties, e.g. strength. One way to do this is the fibre bundle test which is used widely in the cotton industry. Figure 1 shows a bundle of kenaf fibres as received and the distribution of strength obtained from 50 bundle tests on these fibres.

To account for the effect of moisture content, adjustment factors could be applied to the characteristic design strength of natural fibres in each group. Natural variation in the types of characteristic properties, e.g. strength of the fibres, found in natural fibres, and the loose correlation between grading parameters and the actual property, means that there would be a wide range in the strength of a single fibre in any group. In timber, the coefficient of variation for the flexural strength of timber from a single species, single size and single grade is often more than 20 percent. This value is expected to be much greater for natural fibres.



(a) (b)

Figure 1: (a) kenaf fibres and (b) distribution of strength from fibre bundle test.
In the design guidelines, modification factors (kmod) could be applied to the characteristic design strength (fo) of natural fibres in each strength group, to account for external effects including duration of load, moisture condition and temperature. In addition, capacity factors (ϕ) could be applied to the characteristic design strength to account for consequences of failure, from economic considerations to those of human safety.

The broad range of applications of fibre-reinforced composite materials would be classified to provide a consistent and rational approach to design that could be adopted despite the diversity of applications, giving confidence to designers and end users. This approach would be similar to that of steel where there are different design criteria for steel buildings and offshore structures. Limit state design guidelines, which have been recognised internationally as a common basis for Codes of Practice for design in any material or type of construction, could be used to form a logical framework in the design of natural fibre composite product. The framework could provide a universal language for communication between material suppliers, manufacturers, designers and end users, establishing confidence for use of the material.

This work is part of a broader project being undertaken by the CRC for Advanced Composite Structures.

Composite Panel Materials for the Built Environment from Forestry and Food Industry by-products

SMaRT@UNSW
Andrea Wechsler, Dr.Peter Graham, Prof Alan Crosky, Prof Veena Sahajwalla,
Acknowledgements: Dr. Haley Jones (ANU), Dr. George Srzednicki (School of Chemical Sciences), Dr. Magdalena Zaharia, Dr. Aldo Ballerini & Mario Núñez (Composites Material laboratory, University of Bío-Bío, Chile).

This research explores the utilization of wastes of the agricultural and local forestry industry; aiming to decrease the consumption of monocrops (pine wood) traditionally used in the production of panels materials for the Built Environment. The replacement of oil based matrixes, loaded with carcinogen formaldehydes, for a recycled, non toxic or renewable one is evaluated. These panels also aim to solve one of the most concerning problems in high moisture environments for panel materials, which is the dimensional stability, and swelling problems.

The generation of waste from human production activities is a not insignificant burden on the environment. For example, most agricultural and forestry industry activities result in large amounts of by-products that are often treated as waste and sent to landfill. Australia is the main commercial world producer of macadamia nuts, producing around 40,000 tons of macadamia nuts a year, out of a total global production of 100,000 tones. Australia has 122,400,000 planted hectares of radiata pine trees (www.fao.org). The silviculture company, Energy Seeds, produces 100 to 150 cubic meters of empty cones per year after seed extraction (Andy Cameron, Manager Pine Seed Production, SeedEnergy Pty Ltd, personal communication, October 19, 2009). Australia is also the main eucalyptus producer in the world, with 127,024,000 hectares planted. The shells, cones and capsules comprise 70% by weight and more of the macadamia nuts, and tree seeds. After the seeds and nuts are extracted, the shells, cones and capsules are used mainly as mulch and fuel, due to their high lignin and cellulose content. While this avoids being disposed in landfill, which is economically and practically prohibitive due to the sheer volume, it is nonetheless poor utilization of a potentially valuable resource (Wechsler et al., 2011).

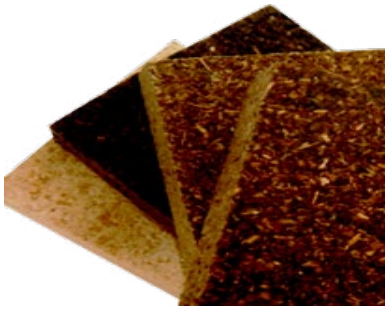


Figure 1. Agricultural and forestry by products panels

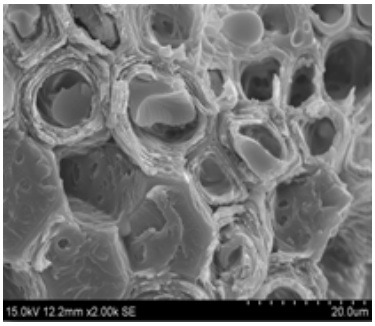


Figure 2. SEM of macadamia shells and castor oil adhesive panel

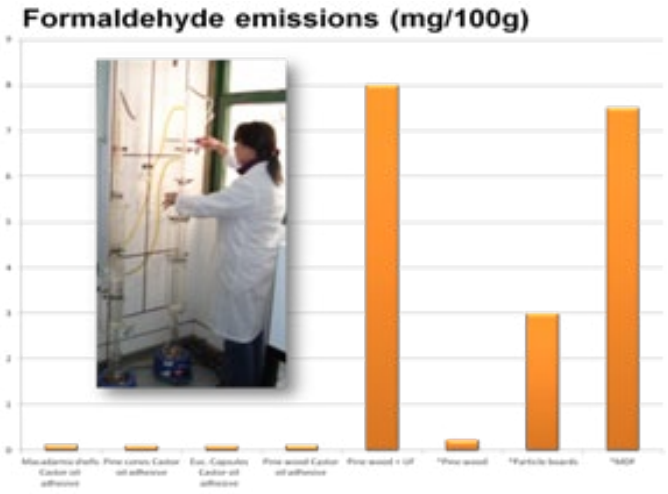


Figure 3. Comparative chart of formaldehyde emissions of agricultural and forestry by products panels compared with wood and traditional particleboards

Results of an exploration into macadamia shells, pine cones, and eucalyptus capsules; used as fillers; bonded with recycled polypropylene and castor oil based adhesive; to be used in composites panel materials is presented. The present study considers and explores the suitability of these materials for high-moisture environment furniture panel applications.

Relevant morphological, physical, mechanical properties and formaldehyde emissions are examined and a comparison with conventional panels based in radiata pine wood and two different matrixes; formaldehyde based adhesive and recycled polypropylene are provided.

The key findings in the present study are summarized as the main physical properties; the water absorption and swelling were up to 70-78% lower in the new proposed panels than in traditional pine wood panels. The mechanical properties presented a lower Modulus of Elasticity and an improved Internal Bonding when compared with their reference sample. And as expected, the formaldehyde emissions were dramatically being 99% lower in the panels with castor oil adhesive as a binder.

The new fibers considered in this paper, macadamia shells, pine cones, and eucalyptus capsules; have shown have acceptable properties for use as fillers and a new opportunity for composite panel application for the built environment, particularly in high moisture environments. As they are composites, their mechanical properties can be improved and analysed by further research. Their physical properties showed that the newly proposed fillers are applicable in panel furniture for high humidity areas.

Figure 4 Schematic diagram of production process of the panels

SMART@ UNSW

Sustainable Materials Research and Technology Centre

Directors Report -Scientia Professor Veena Sahajwalla

The OECD's Steel Committee recently made two concurrent observations; that global growth in demand for steel would increase by a further six per cent in 2011/2012 and that the global steel industry was facing a "formidable environmental challenge". The dual global demands for continued economic growth, and the materials to drive it, and a simultaneous reduction in carbon emissions across all sectors, worldwide, only reinforces the critical role of research centres like SMaRT@UNSW in reimagining our industrial future.

At SMaRT we believe much the solution lies in recycling – not just putting out the yellow bins, although household recycling is important. As researchers, we are pursuing industrial scale recycling of mass waste streams; including complex waste such as used cars made up of multiple components and a wide range of materials. The scope for creating a "virtuous industrial cycle" in which forest waste, for example, is to create sustainable building materials is extraordinary. At the same time we are pursuing improvements in the sustainability of processes, and developing materials with lower carbon footprints. It's only a matter of thinking differently and having the opportunity to pursue new ideas -- in collaboration with industry partners. That's exactly the kind of innovative environment SMaRT has fostered

My own field of research is carbon transformations in steel making, a sector responsible for up to five per cent of total global emissions, and the UNSW patented "green steel" making process reduces demand for coke and electricity is one step towards a more sustainable steel industry. In 2010, "green steel" – now commericalised by the Australian steelmaker, OneSteel – featured in China's Shanghai World Expo. The year's theme, Better City, Better Living attracted tens of millions of visitors over six months, and as UNSW was the only Australian university represented at the expo, SMaRT had an unprecedented opportunity to showcase its research strengths.

We demonstrated the value of cross-disciplinary research into new lower carbon and carbon-neutral materials for panels for use in the built environment

Our sincere thanks

Our achievements to date would not have been possible without all those how have supported us in pursuing our vision. I would like to take this opportunity and thank everyone who has contributed to the Centre, since its inception in 2008, and including the Industry

KEYNOTE/INVITED ADDRESSES – HIGHLIGHTS

- Judge Panel Judging for Robogals Science Challenge November 2011
- Judge Panel Member, The Australian Innovation Challenge Chair Judge, Terry Cutler has selected a short list of 17 entrants in Backyard Innovation, November 2011
- ASTE - China Australia Symposium, Recycling hard waste and liquids, November 2011
- Panel member, Workshop, Building Partnerships with Industry - Science and Engineering , October 2011
- Invited speak, 11Eleven Project, September 2011
- Invited speak, the Big Night of Science, August, 2011
- Invited speaker, Carbon pricing / tax Forum, Hon Member Peter Garrett, July 2011
- Judge Panel Member, Google Science Fair, July 2011
- Invited speaker, IITAA Business Seminar June, 2011
- Invited Speaker, Australian Academy of Technological Sciences and Engineering, on "Commercialising technologies from a university's perspective", Melbourne, March 2011
- Guest Speaker, Early Career Resaerch @UNSW Program, March 2010
- Keynote Speaker, Engineering Leadership Conference, Brisbane, May 2010.
- Invited presenter, Modern Electric Furnace Steelmaking – A Practical Training Seminar, AIST February 2010.
- AIEC Panel Member, the session future casting international students in Australia, rebranding Brand Australia, October 2010

- CSIRO Advanced Materials Conference, Plenary Speaker, May 2010
- Learning to Adapt: The Climate of the Future, Expert Panel Moderator, April 2010
- Engineering Leadership Conference, Panel Member, May 2010
- Make It So Campaign Announcement Event MC, Engineers Australia , August 2010
- Research Showcase at the World Expo, Governor General Visit to China, World Expo, Shanghai, China, June 2010
- Speak, IBM Software Group, April 2010
- Welcome presenter, National Youth Science Forum, July 2010
- Invited speaker, Society for Plastics Engineers Conference, Melbourne, Keynote, November 2010.•
- 'Managing Waste in a Changing Climate' Conference, Launceston, Keynote, March 2009
- Australian Steel Convention on "Creating Opportunities in Challenging Times", Keynote Speaker on Sustainability and Steel, Perth, September 2008
- Plenary address, International Symposium on Sustainable Materials, Malaysia, June 2007
- The Harricks Address, the Institution of Engineers, Australia, Sydney, August 2006
- Recycling materials', the Visionary Address, to the Latin American Iron and Steel Institute, Mexico, May 2006
- Keynote address at the World Scrap Metal Congress, Shanghai, December 2005
- Invited presenter, four-day course Iron/steelmaking, Instituto Argentino De Siderurgia, San Nicolas, Argentina, July 2005
- Invited speaker, The Royal Institution of Great Britain, London, May 2005
- Invited speaker, International Conference on Process Development in Iron and Steelmaking, Luleå, Sweden, June 2004
- Keynote speaker, International Ferro-Alloys Congress, Capetown, February 2004

FUNDING SUCCESS

Funding sources were the Australian Research Council and industry contributions from partners such as Rio Tinto, OneSteel, LKAB Sweden, the Australian Coal Industry Research program, Hatch and Posco.

The 2011 Sustainability Symposium on:

Sustainable Materials, Processes & Technologies: Future pathways for reducing greenhouse gas impacts of materials.

The 2011 Sustainability Symposium on Sustainable materials, processes & technologies was hosted by the SMaRT Centre, in the Lecture Theatre G02, Building F8, UNSW Kensington lower campus, Sydney, Australia from July 7 to 9, 2011. Scientia Professor Veena Sahajwalla, Director, SMaRT@UNSW Centre welcomed the participants of the symposium. Professor, Margaret Harding, Pro-Vice-Chancellor (Research) and Acting Deputy Vice-Chancellor (Research) UNSW, delivered the opening address. The lunch address was by Professor Richard Henry, Deputy Vice-Chancellor (Academic), on UNSW and Industry Research Collaboration.

The event was co-organised by the Department of Energy Science & Technology, University of Kyoto, and International Research Centre for Sustainable Materials, University of Tokyo, and Centre for Sustainable Materials Research, University of New South Wales.

Sustainable Materials Processing is gaining traction worldwide from political arena to research, business and legislations due to implications related to greenhouse emissions and fast depletion of resources.

With the 'then' proposed and 'now' imminent carbon tax in Australia, with the increasing potential for international carbon trading, this symposium served as the key to address several relevant issues from different perspectives through international participation.

The SMaRT centre through this symposium facilitated platform for the industrialists and the academics and the researchers to interact and to share their expertise to move forward together in addressing several environmental issues that relate to Sustainable Materials Processing.

The symposium contents reflected current status of sustainable technologies, challenges involved, recycled and renewable materials including e-wastes and polymers, new Sustainable Materials applications, sustainable and innovative Iron and coal making in the 21st Century, sustainable biomaterials and green Processing.
The symposium provided comprehensive update on emerging trends in sustainable processing and experts from Japan, Korea, India, Canada, Australia and Sweden shared their expertise in sustainable processing. Participants included industrialists from OneSteel Ltd, Australia, Hyundai Steel, Hatch Ltd., Australia, NALCO, India, and several Universities from within and outside Australia, paving way for excellent current and future collaborations.
The symposium was co-chaired by prominent academics and industrialists including Veena Sahajwalla, Kazuki Morita, Paul O'Kane, Caisa Samuelsson, Toru H. Okabe, Don Kirk, Oleg Ostrovski, Fumitaka Tsukihashi, Gangadhara Prusty, Charles Q Jia, P. S. Mukherjee, Kenji Sawada, Takeshi Yoshikawa and Takashi Nakamura. Oleg Ostrovski and Kazuki Morita summed up the three days event during the Panel Discussion. The symposium also provided the researchers at the UNSW and other Universities an opportunity to present their work and exposure to their peers and prominent experts towards their future career goals

ARC Centre of Excellence for Design in Light Metals

The *ARC Centre of Excellence for Design in Light Metals* was established in 2005 with the vision to be an innovative, internationally-competitive strategic fundamental research *Centre of Excellence*, advancing scientific knowledge and understanding in, and enhancing technology development, awareness and applications of, the light metals aluminium, magnesium and titanium. The Centre combines the expertise of the leading Australian light metals researchers based at Monash University, University of New South Wales, University of Queensland, Deakin University, University of Sydney and University of Melbourne. The Centre embraces a novel '*design-directed*' approach to the systematic identification of research initiatives for maximising the competitiveness of light alloys and light metal hybrids based on *aluminium, magnesium* and *titanium*. The 'design-directed' approach provides an effective linkage between fundamental research and engineering application. The Centre has global linkages with major international Centres in Europe, North America and Asia.

The Centre's 6th year of operation was highly successful, with some notable highlights including:

- Commencement of the new Centre Research Portfolio for 2011-13 (Fig. 1):
- Continuation of excellent research outputs from staff and students in the form of high-calibre publications in Science, Nature Communications, Acta Materialia etc., keynote & invited addresses at International Conferences, lodgement of provisional patents and visits to major international laboratories, and
- 5th Annual Workshop hosted by The University of Queensland that attracted over 100 Centre participants including several eminent local and overseas Partner Investigators.

A very exciting highlight worth discussing in detail was the Centre's formal membership of a major European materials science project entitled *Accelerated Metallurgy*. This €30m project involves an innovative approach to the accelerated discovery of new alloy formulations and properties. It is a truly multinational project led by the European Space Agency (ESA) and involves participants from major European Universities, Research Organisations and Industry. Partners include ESA, European Synchrotron Radiation Facility, Institut Laue Langevin, Rolls-Royce, AVIO Group, Centro Ricerche FIAT, EADS Innovation Works, ArcelorMittal, Magnesium Elektron Ltd, Bruker EAS GmbH, Bruker Advanced Superconductors, Norsk Titanium AS, TLS Technik GmbH, MTT Technologies Group Ltd, Granta Design Ltd, Avantys Engineering GmbH, SINTEF, Risø DTU, Université de Rouen, University of Birmingham, AGH-Krakow, Università di Torino, University of Sheffield, Universität Ulm, Cardiff University and Cambridge University. Membership on this project represents a very exciting time for both the Centre and the School of Materials Science & Engineering, UNSW.

The School continues to play a major role in the Centre and is active in several of its research projects. Professors Michael Ferry and Mark Hoffman have continued with their major leadership roles in the two key research programs. The research program structure of 2010 has been modified in line with the new Centre Research Portfolio (2011-13) and the formal partnership in the European project on Accelerated Metallurgy. Fig. 1 shows the new programs: Program A consists of the six projects in Al, Mg, and Ti; Program B consists of two projects in Hybrid Materials and Surface Engineering; Program C involves linkage projects with various industry partners, and Program D involves research associated with the Accelerated Metallurgy project. The School will play a key role in the latter where research will focus on new classes of bulk metallic glasses, high entropy alloys and phase change alloys. Selected research highlights of UNSW researchers in 2011 are outlined below.

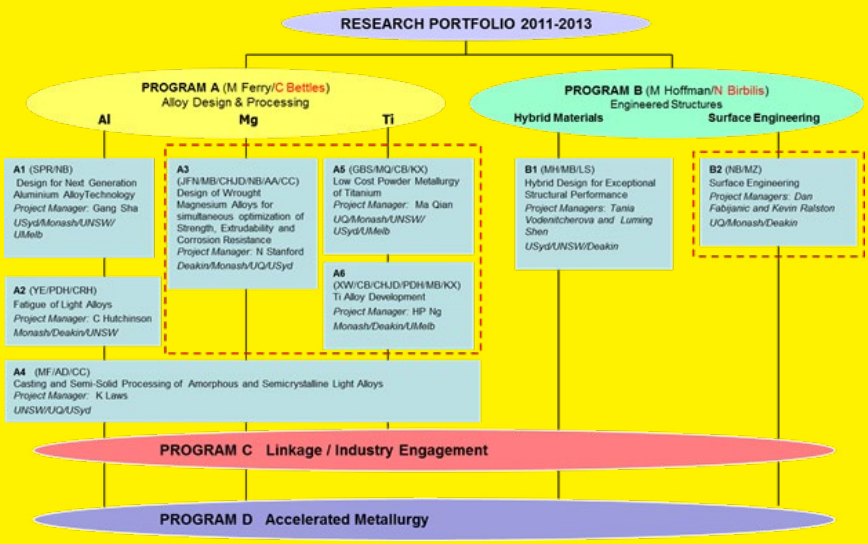


Figure 1: Centre research portfolio for 2011-13.

Project A2 – Fatigue in Nanocrystalline Aluminium Alloys

UNSW Researchers: Prof. Mark Hoffman, George Tang, Dr Zakaria Quadir

This project has looked at the exceptional fatigue-crack growth behaviour shown by nanocrystalline alloys. It is found that under cyclic fatigue loading, a grain recovery occurs in the crack-tip process zone consequently affecting fatigue. There are also dramatic changes in the crack path tortuosity leading to changes in crack growth closure. Interestingly, a nanocrystalline transition region is found soon after the threshold where large changes in stress intensity fracture amplitude lead to only very small increases in crack growth rate. A second transition occurs where classical power law fatigue commences.

Project A4 – Lightweight Bulk Metallic Glasses

UNSW Researchers: Prof. Michael Ferry (P Leader), Dr Kevin Laws (Project Manager), Dr Martin Xu, Dr Phil Boughton, Dr Zakaria Quadir, Jake Cao, Nasima Afrin, Yi Cao, Karl Shamlaye, John Scicluna, Fitri Mohamad, Olga Biletska

Lightweight bulk metallic glasses (BMGs) are a relatively new class of metal alloys that have a metastable amorphous structure. They generally exhibit attractive properties suitable for structural and mechanical applications, including exceptionally high strengths (often ~3x that of their crystalline counterparts), high elastic limits and near zero mechanical damping or energy loss characteristics. Overall, the discovery that BMGs can be cast by conventional routes has generated considerable interest in the production and properties of these materials. This discovery has also generated substantial interest in the development of forming processes for these materials in both the semi-solid state and in the supercooled liquid (SCL) region. The project involves three major streams of research: Stream A aims to extend the types of BMG compositions based on a fundamental approach to alloy design of BMGs and involves investigations of their microstructure at the highest levels of sophistication; Stream B aims to generate actual devices and components for certain end-applications, and Stream C aims to generate both monolithic alloy and BMG composite components via the semi-solid processing route.

Again, 2011 has been exciting for the BMG project. A number of new Mg-based BMGs displaying substantial room temperature ductility have been discovered. Ongoing studies into Mg-Zn-based BMGs, which were found to exhibit extraordinary room temperature ductility whilst retaining yield strengths in excess of 800 MPa, has uncovered specific composition range limits for maximising this ductility. Molecular dynamics modelling combined with advanced high energy x-ray scattering studies are currently underway to determine the possible mechanism of the enhanced ductility. In our BMG/crystalline composite research, we have discovered specific orientation relationships between metastable Mg-rich flake-like precipitates, a thin interfacial copper layer and yttria particles (Fig. 2b). This important nucleation mechanism is deemed responsible for generating the uniform distribution of ductile flakes in the amorphous matrix (Fig. 2a) and, hence, improving the ductility of the material.

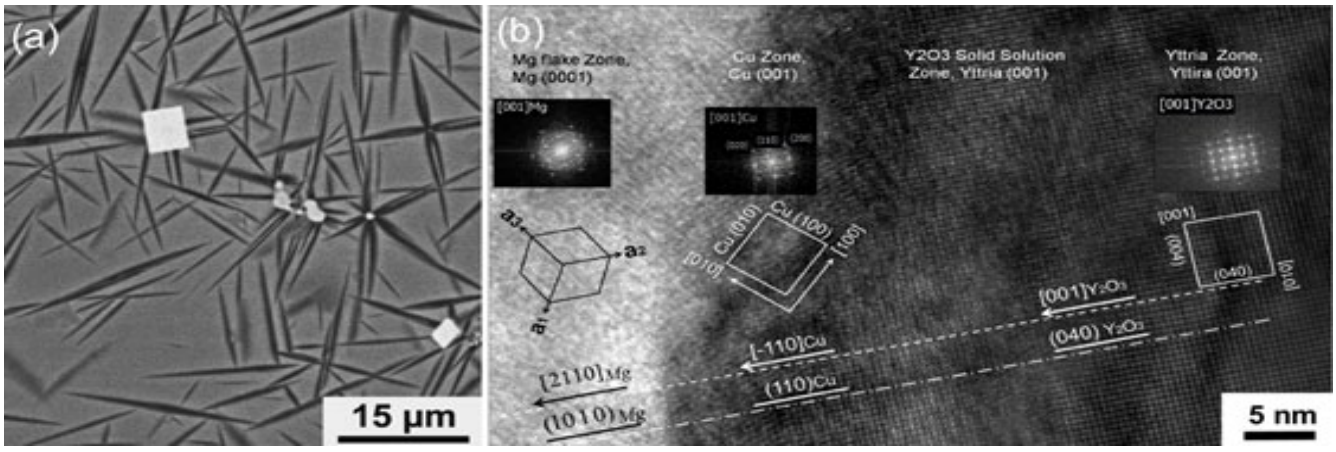


Figure 2 (a) As-cast Mg-flake structure (dark contrast) emanating from yttria (Y2O3) particles (white) within an amorphous matrix. (b) High resolution TEM image of the orientation relationships between crystallographic planes of Y2O3, copper and magnesium.

Our research on Mg-Ca-based BMGs has identified several specific alloy compositions that display biocompatibility suitable for absorbable implants. Alloys with suitable thermoplastic processing properties are now being utilised in elevated temperature superplastic forming within the SCL region for generating prototype components, an example of which is shown in Fig. 3.

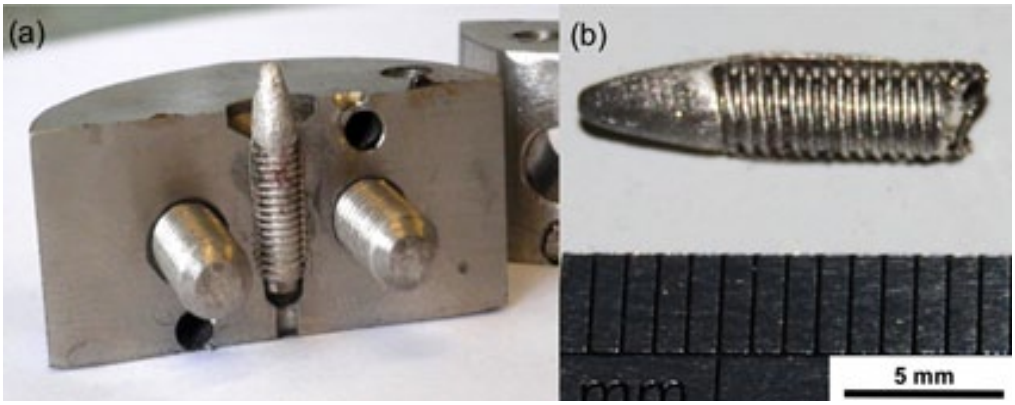


Figure 3: A thermoplastically formed biocompatible Mg-Ca BMG threaded shaft.

Project A5 - Ti Powder Processing

UNSW Researchers: A/Prof. Sammy Chan, Prof. Michael Ferry, Wei Guo, Yin Yao.

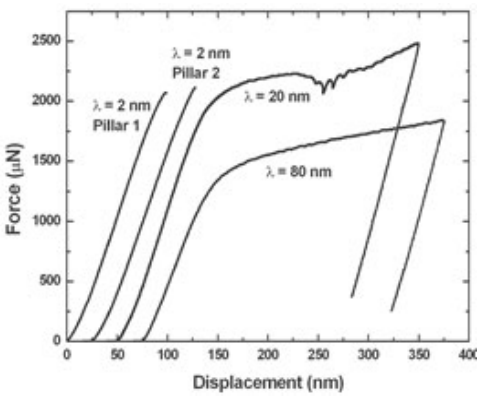
This project is based on the premise that there will soon be a commercial source of inexpensive titanium powder (either commercially pure or in alloy form). The aim, therefore, is to develop new titanium alloys and/or processing strategies based on a powder metallurgical approach, whilst at the same time addressing some of the fundamental issues associated with the various processing steps. The critical parameters associated with various powder metallurgical processing routes are being investigated. These include: (i) selecting the appropriate powder to achieve maximum consolidation; (ii) selecting the alloy composition and the form in which the alloy will be processed (pre-alloyed/blended elemental); (iii) investigating the effect of selected thermomechanical processing on the final properties and microstructure, and (iv) investigating the effect of hard second phase particles on mechanical behaviour of the alloys.

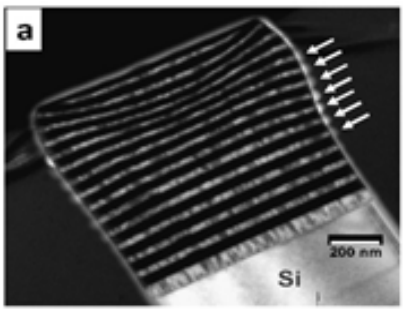
Project B1.1 - Hybrid Structures - Micro/Nanoscale Multilayers

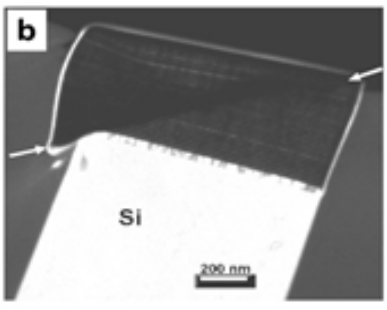
UNSW Researchers: Prof. Mark Hoffman (Program Leader), Dr Tania Vodenitcharova (Project Manager), Neil Lazo, Dr Zakaria Quadir, Pranesh Dayal, Sayedeh Emani Khansari, Prof. Nick Savvides

The project aims to develop hybrid structures based upon light alloy systems utilising advantages obtained from combining specific architectures or materials to obtain exceptional behaviour in the property compositional space. The project has followed two streams.

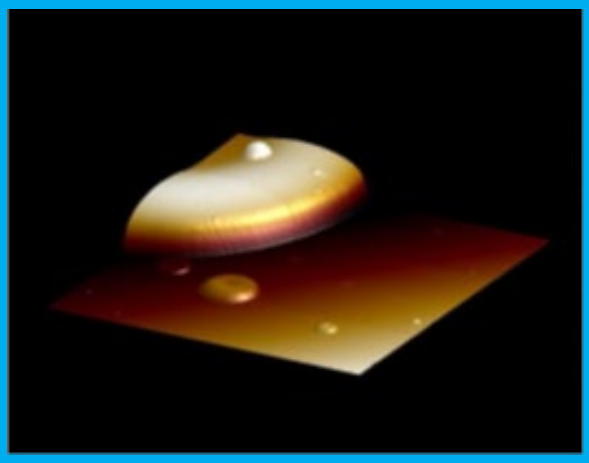
The first stream looks at nanolayered structures. Pranesh Dayal's PhD looked at multi-layered aluminium-palladium layers of thicknesses of 1-20nm per layer. Exceptional hardness and a slight increase in Young's modulus were observed with hardness increasing with decreasing layer thickness. This was most evident once the layer thickness came below 10nm. A novel experiment involving the creation of nanopillars of multilayered structures revealed a transition in mechanisms from where the softer layer, i.e., the aluminium extruded radially from the pillars during compression to one where a sheer process caused failure of the pillar where the layers became very thin. This transition corresponded to the dramatic increase in hardness with decreasing layer thickness observed in the hardness tests.







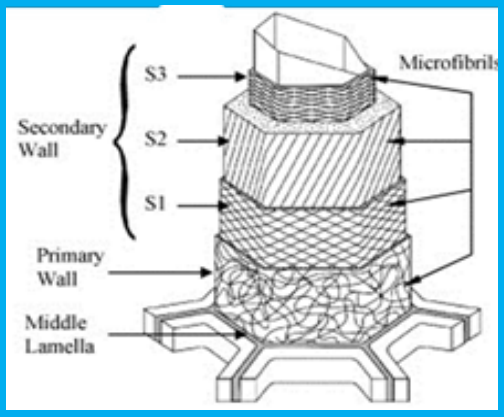
A new project has commenced in the nanolayered section of the program looking at phase-change materials. Phase-change materials are alloys where a transition from polycrystalline to amorphous phase also corresponds to a change in reflectivity and electrical conductivity. These materials are already used extensively in DVDs and CDs where the change in reflectivity is used to record data. The phase transition being induced by laser pulses. The current project extends this to utilise the corresponding changes in electrical conductivity. The reason for this is that information density is limited using the optical processes by optical limitations. By using electrical resistivity changes, greater information density will be able to be obtained. The project is currently concentrating on the Sb2Te system which is known to have good phase-transition rates but limited stability. The intention is to improve this and to also look at the fatigue. The PVD deposition process provides some interesting images using the AFM as shown below.

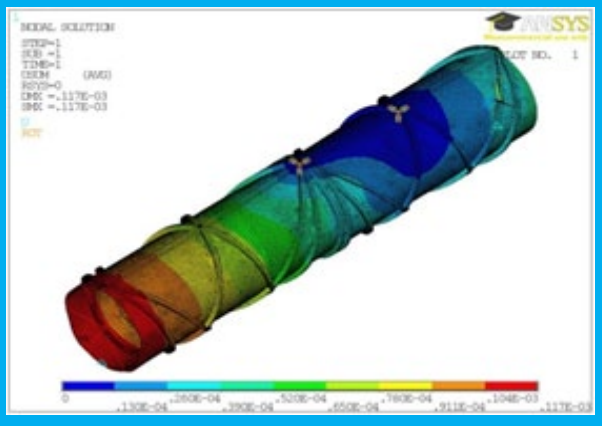


Project B1.2 – Hybrid Structures – Low Density Structures

UNSW Researchers: Prof. Mark Hoffman (Program Leader), Dr Tania Vodenitcharova (Project Manager), Neil Lazo,

The second stream is to develop low-density, high-strength structures. Previous work concentrated on foam laminates. The current project is now using genetic algorithms to design internal truss structures for both laminates and also more complex structures which optimise low deflection with low weight and high strength. The models are based upon biological structures which are then modified around materials properties. Once designed, these structures will be manufactured for prototyping using laser processing methods. Current work has concentrated upon developing turbine engine nacellae. The images below show the use of helical ribs based upon the concept of a plant stem.





Michael Ferry
Deputy Director & Program A Leader
& Mark Hoffman
Program B Leader
ARC Centre of Excellence for
Design in Light Metals

SIMPAS

Directors Report - Scientia Professor Aibing Yu

Much of our environment and the benefits that we derive from our surroundings are strongly influenced by the interactions of the three primary phases of matter – solids, liquids, and gases. These interactions often occur on surfaces, with the individual phases being discrete in form. Particles/powders, which can be either wet or dry, and range in size from nanometers to centimeters, are one very important example of such a multiphase system. As with solids, bulk powders can withstand deformation; as with liquids, they can flow; as with gases, they exhibit compressibility. These features give rise to another state of matter – particulate matter – that is poorly understood. Particulate science and technology is a rapidly developing interdisciplinary research area with its core being the understanding of the relationships between micro- and macro-scopic properties of particulate materials. It is now emerging as a core competency of paramount importance to many sectors of our modern economy. The macroscopic behavior of a powder is controlled by the interactions between individual particles as well as interactions with any surrounding gas or liquid. Understanding the microscopic mechanisms in relation to these interaction forces is key to leading to truly interdisciplinary research into particulate matter, in which scientists and engineers correlate their findings and ensure that microscopic predictions from one discipline match macroscopic results from another. It is extremely difficult to obtain microscopic information experimentally, even with the use of advanced and expensive measuring techniques. However, this difficulty can be overcome by computer simulation and modelling. This point of view has been widely accepted among the scientists working in this area, particularly in recent years as a result of the rapid development of discrete particle simulation techniques and computer technology.

Laboratory for Simulation and Modelling of Particulate Systems (SIMPAS) is a world class, multi-disciplinary research facility established and directed by Professor Aibing Yu, ARC Federation Fellow and UNSW Scientia Professor. Its research theme aims at understanding the mechanisms governing particulate packing and flow through rigorous simulation and modelling of the particle-particle and particle-fluid interactions at both microscopic and macroscopic levels, with its application oriented to mineral/metallurgy/chemical/materials industries. Its goal is to be internationally recognised through excellence in fundamental and applied research in particulate science and technology. Its mission is

- to establish a world-class interdisciplinary research team, supported by the rapidly developed computational techniques and computer technology, in the field of particulate science and technology;
- to provide a forum to research scientists from various disciplines for exchanging ideas and developing collaborative research in computational particulate technology;
- to promote the application of particulate science and technology, newly developed understanding and research techniques in particular, to industry; and
- to contribute to the education and training of high quality postgraduates in particulate science and technology.

The research in SIMPAS is developed in five inter-related areas at three levels, including the development of simulation and modelling techniques (level 1), fundamental studies of particle packing and flow, and the transport properties of static/dynamic particle systems (level 2), and industrial application (level 3), as shown in Fig. 1.

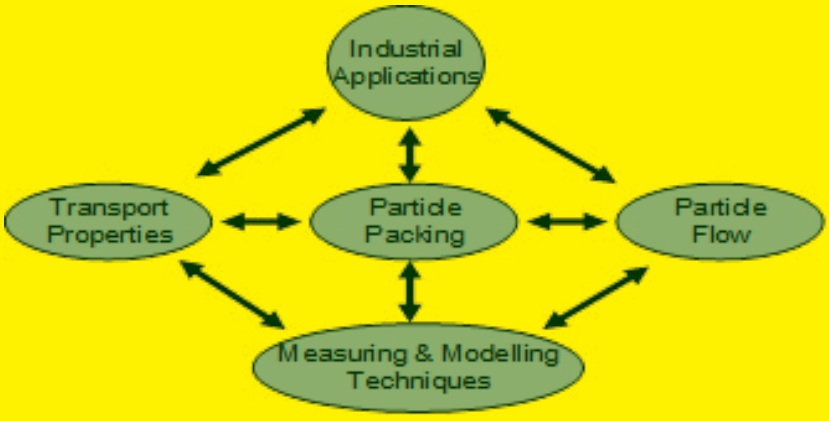


Fig. 1 Research areas/components and their links in Simpas For details, please refer to http://www.simpas.unsw.edu.au/).

Since 1993, SIMPAS has attracted over $25M external research funds to UNSW including >45 grants from the Australian Research Council, and graduated 44 PhD and 18 MEng students (6 Ph.D and 4 M.Eng graduated/ submitted in 2011), while hosting >35 postdoctoral researchers. Research collaboration has been made with various industrial organizations including Bluescope Steel, BHP-Billiton (including BMA), Alcoa, Xstrata, ACARP, Rio Tinto, Johnson and Johnson, Minco Technologies, DSTO, Cement Australia, Minco Tech, and many overseas R&D organizations such as Kawasaki Steel (Japan), China Steel (Taiwan), Posco Steel (South Korea), Tata Steel (India), BaoSteel and Long King (China); and other universities and research institutes including CSIRO. Clearly, SIMPAS has established its leading position in the main theme research areas such as particle packing, particulate and multiphase flow/processing (in, e.g. ironmaking and coal preparation), and simulation and modelling.
In 2011, SIMPAS was comprised of 15 teaching/research/administrative staff and 40 research students. It attracted >$3M research funds (~$2.45M external and ~$0.55M internal), and published 2 book chapters, 40 journal and 12 conference papers, plus a number of invited plenary/keynote presentations at international conferences. It successfully organized the 3rd ECI International Conference on Particulate Processes in the Pharmaceutical Industry, and hosted tens of visitors from various parts of the world.

Major recognitions of Simpas members in 2011 include:

- Aibing Yu: Elected Fellow, Australian Academy of Science; Distinguished Visiting Fellowship Award, Royal Academy of Engineering; Top 100 Australia's Most Influential Engineers.
- Bolin Wang: Australian Future Fellowship 2011-2014
- Zean Tian: Vice-Chancellor's Fellowship 2011-2013
- Zhenbo Tong, Best Poster Award, Singapore Symposium on Drug Delivery Systems, Singapore
- Yansong Shen: Runner-up, School of Materials Poster Competition, UNSW
- Mathew Komiyama: Winner of 2011 Presentation Competition, School of Materials, UNSW; Best Poster Award 2011, School of Materials Poster Competition, UNSW
- Zongyan Zhou: promoted to Lecturer, with his position sponsored by UNSW and OneSteel.
- Baoyu Guo: Promoted to Research Fellow
- Minghao Wang, Zhenbo Tong, Wen Xu: UNSW Postgraduate Travel Award, 2011

New research grants for projects commencing in 2012 include:
1. Kejun Dong, Simulation and Characterization of the Packing of Uniform Non-Spherical Particles, ARC DECRA, $375k (2012-2014).
2. Aibing Yu, Process modelling and analysis for improving energy efficiency in Baosteel, Baosteel-Australia Joint Research & Development Centre, $660K (2012-2014)
3. Aibing Yu, Runyu Yang and 11 CIs from other groups, A graphic processing unit based advanced computational facility for particulate research, ARC LIEF, $850k (2012) ($350K from ARC, $350k from UNSW, and $150k from other three Univ.).
4. Aibing Yu and Zongyan Zhou, Packing, sedimentation and fluidisation of ellipsoidal particles, UNSW Gold Star Grant, $40k (2012).
5. Kejun Dong, Structure analysis of the packing of multi-sized spherical particle, FRGP 2012,$11K.
6. Tian Zean, Simulation study on solidification processes and microstructure evolution of metal nanodroplets, ECR 2012, $11K
7. Kaiwei Chu, Illustrating the underlying mechanisms of the effect of coal in dense medium cyclones, FGRP 2012, $6k
8. Xuchuan Jiang, Deposition of thermochromic vanadium oxide nanofilms for smart glass coatings, FGRP 2012, $11k
9. Zongyan Zhou, Model studies of the heat transfer of ellipsoidal particles in fluid-bed reactors, FGRP 2012, $16k
10. Shibo Kuang, Micromechanic modelling and analysis of dense-phase pneumatic transport of powders, FGRP 2012, $6K
11. Yansong Shen, Model studies of co-firing charcoal in ironmaking blast furnace: a sustainable alternative for less CO2 emissions, FGRP 2012, $6K

External Research Grants

CI Name	Project Title	Sponsor/Scheme Name	Awarde
Aibing Yu	Experimental studies of multiphase flow in fluid bed reactors	BlueScope Steel Research/ARC Linkage Project Industry Partner Contribution	$12,000.00
	APAI - Multiscale modelling of the transport phenomena of liquid iron and slag in ironmaking blast furnace	Australian Research Council/Linkage Project	$12,813.00
	Granular dynamics: characterization, modelling and application	Fujian Longking Co., Ltd/ARC Linkage Project Industry Partner Contribution	$25,000.00
	APAI#1 - Experimental studies of multiphase flow in fluid bed reactors	Australian Research Council/Linkage Project	$26,140.00
	APAI#2 - Experimental studies of multiphase flow in fluid bed reactors	Australian Research Council/Linkage Project	$26,140.00
	APAI#1 - Amir Esfandiary - Particle scale modelling and analysis of the multiphase flows in coal preparation	Australian Research Council/Linkage Project	$26,669.00
	APAI#2 - Maryam Ghodrat - Particle scale modelling and analysis of the multiphase flows in coal preparation	Australian Research Council/Linkage Project	$26,669.00
	APAI#3 - Chuyang Chen - Particle scale modelling and analysis of the multiphase flows in coal preparation	Australian Research Council/Linkage Project	$26,669.00
	APAI#4 - Jiang Chen - Particle scale modelling and analysis of the multiphase flows in coal preparation	Australian Research Council/Linkage Project	$26,669.00
	APAI#1 - Siyuan Yang - Granular dynamics: characterization, modelling and application	Australian Research Council/Linkage Project	$26,669.00
	APAI#2 - Ke Li - Granular dynamics: characterization, modelling and application	Australian Research Council/Linkage Project	$26,669.00
	Feasibility Study of Underwater Impediment of Vision.	Defence Science & Technology Organisation /Maritime Operations Division Contract Research	$34,545.00
	Curtin Uni Admin. Multiphase Flow Characterization Facility.	University of New South Wales/ARC LIEF Central Contribution	$36,000.00
	Fundamental investigation of the briquetting behavior of iron ore fines.	Australian Research Council/Linkage Project	$50,000.00
	Fundamental investigation of the packing and compaction of iron ore fines	Hamersley Iron Pty Ltd/ARC Linkage Project Industry Partner Contribution	$50,000.00
	Particle scale modelling and analysis of the multiphase flows in coal preparation.	Minco Tech Australia Pty Ltd/ARC Linkage Project Industry Partner	$50,000.00
	Numerical and experimental studies of the gas-particle flow and dust collection in electrostatic precipitation systems	Fujian Longking Co., Ltd/ARC Linkage Project Industry Partner Contribution	$95,000.00
	Particle scale modelling and analysis of the multiphase flows in coal preparation.	Beijing AriTime Intelligent Control Co. Ltd /ARC Linkage Project Industry Partner	$100,000.00
	Multiscale modelling of the transport phenomena of liquid iron and slag in ironmaking blast furnace	BlueScope Steel Research/ARC Linkage Project Industry Partner Contribution	$105,000.00
	Discrete particle modelling and analysis of complex particle-fluid flows	Australian Research Council/Discovery Project	$110,000.00
	Particle scale modelling and analysis of the multiphase flows in coal preparation	Australian Research Council/Linkage Project	$121,324.00
	Numerical and experimental studies of the gas-particle flow and dust collection in electrostatic precipitation systems	Australian Research Council/Linkage Project	$142,000.00
	Multiscale modelling of the transport phenomena of liquid iron and slag in ironmaking blast furnace	Australian Research Council/Linkage Project	$262,528.00
	Multiscale modelling and analysis of complex particulate and multiphase flow	Australian Research Council/Federation Fellowship	$327,746.00
	Simulation of the liquid flow from the melting line in a FINEX Melter/Gasifier	POSCO Korea / Contract Research	$37,302
Alan Crosky	CRC-ACS Supplemental PhD Scholarship for Mr Mohd Nazarudin B Zakaria	CRC for Advanced Composite Structures/Scholarships	$9,000.00
	CRC-ACS Supplemental PhD Scholarship for Ms Niphaphun Soat-thiyanon	CRC for Advanced Composite Structures/Scholarships	$9,000.00
	Experimental validation of the strain invariant failure theory for carbon/epoxy composites.	The Boeing Company/ARC Linkage Project Industry Partner Contribution	$10,000.00

CI Name	Project Title	Sponsor/Scheme Name	Awarded
Alan Crosky	Experimental validation of the strain invariant failure theory for carbon/epoxy composites.	Australian Research Council/Linkage Project	$23,750.00
	Plant Fibre Biocomposites.	CRC for Advanced Composite Structures/Contract Research	$24,280.00
	Avoiding catostrophic failure of rock bolts in underground coal mines	Australian Research Council/Linkage Project/Materials Fraction	$41,836
Baolin Wang	Mechanics of Micro/Nanoscale Multilayers: Theories and Applications	Australian Research Council/Future Fellowship	$20,400.00
	Mechanics of Micro/Nanoscale Multilayers: Theories and Applications	University of New South Wales/ARC Future Fellowship Central Contribution	$50,000.00
	Salary Support - Mechanics of Micro/Nanoscale Multilayers: Theories and Applications	Australian Research Council/Future Fellowship	$153,298.00
Charles Sorrell	Development of Refractories from Fly Ash	NewSouth Innovations/Contract Research	$70,000.00
	Modification of Optical Properties of Photocatalytic Titania	Australian Research Council/Discovery Project	$105,000.00
Danyang Wang	Development of high-performance lead-free piezoelectric superlattices for environmentally-friendly and biocompatible pMUTs applications	Australian Research Council/Discovery Project	$70,000.00
David Young	Corroded 316 with Coke build up.	QER PTY LTD/Consultancy	$2,850.00
Dewei Chu	APD - Development of Advanced Metal Oxide Materials for Next Generation Nonvolatile Memory Devices.	Australian Research Council/Discovery Project	$81,846.00
	Development of Advanced Metal Oxide Materials for Next Generation Nonvolatile Memory Devices	Australian Research Council/Discovery Project	$138,604.00
Guangqing Zhang	Fundamentals of an Innovative Technology for Solar Silicon Production	Elkem Solar/ARC Linkage Project Industry Partner Contribution	$25,500.00
	Fundamentals of an Innovative Technology for Solar Silicon Production	Australian Research Council/Linkage Project	$78,000.00
	Low-cost solar silicon.	Australian Solar Institute/ASI Round 2	$393,272.00
Jan Seidel	Nanoscale Characterization And Manipulation of Complex Oxide Interfaces And Topological Boundaries.	Australian Research Council/Future Fellowship	$24,500.00
	SALARY SUPPORT: Nanoscale Characterization And Manipulation of Complex Oxide Interfaces And Topological Boundaries.	Australian Research Council/Future Fellowship	$64,316.00
Jiabao Yi	THE DEVELOPMENT OF ADVANCED DILUTED MAGNETIC SEMICONDUCTORS THROUGH NONMAGNETIC ELEMENT DOPING AND DEFECT ENGINEERING FOR SPIN TRANSISTORS	Australian Research Council/Discovery Project	$27,924.00
	QEII-The Development of advanced diluted magnetic semiconductors through nonmagnetic element doping and defect engineering for spin transistors.	Australian Research Council/Discovery Project	$122,076.00
John Daniels	Multi-functional structured composite scintillation materials for neutron detections.	Australian Institute of Nuclear Science and Engineering /AINSE Awards	$1,650.00
	Honours Scholarship for Steven Pert.	Australian Institute of Nuclear Science and Engineering /AINSE Honours Scholarships	$5,000.00
	Determination of actuation mechanisms in novel high-response electro-mechanical materials for future functional materials design	University of New South Wales/Goldstar-ARC	$40,000.00
	Research support - Application of advanced diffraction techniques for component and material design in functional, biological and structural applications	Australian Institute of Nuclear Science and Engineering / Research Fellowships	$45,000.00
	Salary - Application of advanced diffraction techniques for component and material design in functional, biological and structural applications	Australian Institute of Nuclear Science and Engineering / Research Fellowships	$58,489.00
	Bose 3300 electro-force mechanical testing instrument & Hot/Cold chamber e tension	University of New South Wales/Major Equipment & Infrastructure Scheme	$200,000.00
	Electric-field and strain interactions with defect structures in electro-ceramics	International Synchrotron Access Program	$6,048.00
	In-situ multi-length-scale analysis of deformation mechanisms in polyamorphous metallic glass systems	International Synchrotron Access Program	$8,000.00
Kevin Laws	A Fundamental Approach to Generating New Classes of Light-Weight Bulk Metallic Glasses Based on Liquid-Metal Structures	University of New South Wales/Goldstar-ARC	$40,000.00
Mark Hoffman	Simulation of cyclic fatigue in lead-free piezoelectric ceramics - Postgraduate research award for Hugh Simons	Australian Institute of Nuclear Science and Engineering / Postgraduate Research Award	$13,000.00
	Project A2 Fatigue of Light Metals	Monash University/ARC Centres of Excellence Shared Grant / Subcontract	$35,000.00

CI Name	Project Title	Sponsor/Scheme Name	Awarded
Mark Hoffman	OneSteel & UNSW jointly funded academic position.	OneSteel Whyalla Steelworks/Contract Research	$60,000.00
	Cyclic Fatigue Mechanisms in New Lead-Free Piezoelectric Ceramics	Australian Research Council/Discovery Project	$125,000.00
	Project B1 Hybrid Design for Exceptional Structural Performance	Monash University/ARC Centres of Excellence Shared Grant / Subcontract	$202,000.00
Michael Ferry	Project A1 Desing of Next Generation Aluminium Alloy Technology	Monash University/ARC Centres of Excellence Shared Grant / Subcontract	$5,000.00
	Project A5 Low Cost Powder Metalurgy of Titanium	Monash University/ARC Centres of Excellence Shared Grant / Subcontract	$35,000.00
	Bulk metallic glasses for ballistic armour applications	CRC for Advanced Manufacturing/Project Grant	$41,855.00
	A 3D crystallographic framework for understanding the structure of deformed and annealed metals	Australian Research Council/Discovery Project	$100,000.00
	Project A4 Casting, Laser melting and Semi-Solid Processing of Amorphous and Semicrystalline Light Alloys	Monash University/ARC Centres of Excellence Shared Grant / Subcontract	$220,330.00
Nagarajan Valanoor	New Generation Lead-free Piezoelectric Ceramics for Acoustic Sensor Technologies	Australian Research Council/Linkage Project	$7,720.00
	Nano scale engineering and exploration of new functional materials towards the high performance of a multi-ferroic sensor device	Tokyo Institute of Technology /Contract Research	$14,605.00
	New Generation Lead-free Piezoelectric Ceramics for Acoustic Sensor Technologies	Thales Australia Limited/ARC Linkage Project Industry Partner Contribution	$25,000.00
	APAI -Ronald Maran- New Generation Lead-free Piezoelectric Ceramics for Acoustic Sensor Technologies	Australian Research Council/Linkage Project	$26,140.00
	APAI - Julian Walker New Generation Lead-free Piezoelectric Ceramics for Acoustic Sensor Technologies	Australian Research Council/Linkage Project	$26,140.00
	Hybrid magnetoelectric nanostructures: Optimizing interface coupling for enhanced functionality. ST020078	Department of Education, Science and Training /Australia-India Strategic Research Fund	$45,000.00
	Elastically controlled magnetoelectric transduction in thin film multilayers.	Australian Research Council/Discovery Project	$50,283.00
	Elastically controlled magnetoelectric transduction in thin film multilayers.	Australian Research Council/Discovery Project	$59,717.00
	High speed dielectric/piezoelectric semiconductor properties analyzer; & Probe station with heating temperature stage	University of New South Wales/Major Equipment & Infrastructure Scheme	$112,400.00
	Nanostructured ferroic oxides: Why nanoscale heterogeneity matters?	Australian Research Council/Discovery Project	$180,000.00
	Dynamic Phase Behaviour Characterisation Facility for Nanostructured Interfaces and Solids	University of New South Wales/ARC LIEF Central Contribution	$382,000.00
	Dynamic Phase Behaviour Characterisation Facility for Nanostructured Interfaces and Solids	Australian Research Council/LIEF	$680,000.00
Oleg Ostrovski	A Novel Approach to Processing of Australian Laterite Ores through Selective Reduction and Carbonylation – Top-Up scholarship for Yongli Cui	CSIRO - Commonwealth Scientific and Industrial Research Organisation/Flagship Postgraduate Top-Up Scholarships	$5,250.00
	A Novel Approach to Processing of Australian Laterite Ores through Selective Reduction and Carbonylation – Top up scholarship for Jun Yang	CSIRO - Commonwealth Scientific and Industrial Research Organisation/Scholarship	$7,000.00
	Optimisation of Australian coking coal utilisation for steelmaking.	BHP Billiton Limited/Contract Research	$18,750.00
	Optimisation of Australian coking coal utilisation for steelmaking.	BlueScope Steel/Contract Research	$20,000.00
	Alternative technology for titanium tetrachloride: production and chlorination of titanium oxycarbonitride	Australian Research Council/Discovery Project	$22,970.00
	Characterisation of carbonaceous materials in production of manganese alloys	Tasmanian Electro Metallurgical Company/ARC Linkage Project Industry Partner Contribution	$40,000.00
	Characterisation of carbonaceous materials in production of manganese alloys	Australian Research Council/Linkage Project	$60,000.00
	APF - Alternative technology for titanium tetrachloride: production and chlorination of titanium oxycarbonitride	Australian Research Council/Discovery Project	$77,030.00
	A Novel Approach to Processing of Australian Laterite Ores through Selective Reduction and Carbonylation	Australian Research Council/Discovery Project	$110,000.00
Paul Munroe	Conversion of Lignite to Biochars to Enhance Soil Fertility	Ingite Energy Pty Ltd/ARC Linkage Project Industry Partner Contribution	$10,000
	Conversion of Lignite to Biochars to Enhance Soil Fertility	Australian Research Council/Linkage Project	$39,000
Ruiping Zou	Experimental and numerical studies of the packing and piling of coal	Baoshan Iron & Steel /ARC Linkage Project Industry Partner Contribution	$60,000.00
	APDI - Experimental and numerical studies of the packing and piling of coal	Australian Research Council/Linkage Project	$78,591.00

CI Name	Project Title	Sponsor/Scheme Name	Awarded
Ruiping Zou	APDI - Model studies of the flow and thermal behaviour of non-spherical particles in fluid bed reactors	Australian Research Council/Linkage Projects	$73,618
Runyu Yang	Developing novel aerosol inhalers for pulmonary drug delivery from the fundamental understanding of powder dispersion mechanisms.	University of Sydney/ARC Discovery Project Shared Grant / Subcontract	$42,500.00
	Multi-scale modelling of particle breakage in grinding process	Australian Research Council/Discovery Project	$95,000.00
Sammy Chan	Environmental Induced Cracking of Dissimilar Metal Welds.	Australasian Corrosion Association/Contract Research	$2,955.00
	Deakin Uni Admin. Facility for the development of new lightweight extruded alloys.	University of New South Wales/ARC LIEF Central Contribution	$18,750.00
	Yuan Ze faculty Development Program 2011.	Yuan Ze University/International Consultancy	$56,914.00
Sean Li	Development of High Performance Ceramic Based Thermoelectric Materials for Power Regeneration Applications	Australian Research Council/Discovery Project	$1,430.00
	Development of high-performance Si/Ge superlattice thermoelectric materials with optimization of lattice periodic thickness - PhD stipend	University of Sydney/ARC Discovery Project Shared Grant / Subcontract	$26,713.00
	A Comprehensive Magneto-Thermophysical Property Measurement System for the Development of Advanced Materials, Energy and Biomedical Technologies	University of Western Sydney/ARC LIEF Shared Grant / Subcontract	$30,000.00
	A Comprehensive Magneto-Thermophysical Property Measurement System for the Development of Advanced Materials, Energy and Biomedical Technologies	University of Wollongong/ARC LIEF Shared Grant / Subcontract	$40,000.00
	Interface Engineering of Complex Oxide Heterostructures for High Efficiency Thermoelectric Energy Conversion	Australian Research Council/Future Fellowship	$50,000.00
	A Comprehensive Magneto-Thermophysical Property Measurement System for the Development of Advanced Materials, Energy and Biomedical Technologies	University of Sydney/ARC LIEF Shared Grant / Subcontract	$50,000.00
	A Comprehensive Magneto-Thermophysical Property Measurement System for the Development of Advanced Materials, Energy and Biomedical Technologies	Deakin University/ARC LIEF Shared Grant / Subcontract	$50,000.00
	Development of a Thermoelectric Generator for Application in a CST Topping Cycle	CSIRO - Commonwealth Scientific and Industrial Research Organisation/Australian Solar Institute R&D Shared Grant/ Subcontract	$81,000.00
	Materials Optimization and Interfacial Engineering of Cobalt and Europium Codoped ZnO for Multifunctional Spintronic Devices	Australian Research Council/Discovery Project	$110,000.00
	Quadrupole mass spectrometer for STA 449F1	University of New South Wales/Major Equipment & Infrastructure Scheme	$120,000.00
	Salary Support - Interface Engineering of Complex Oxide Heterostructures for High Efficiency Thermoelectric Energy Conversion	Australian Research Council/Future Fellowship	$153,298.00
	Proof of concept validation.	Kinetic Energy Australia Pty Ltd/Consultancy	$250,000.00
	A Comprehensive Magneto-Thermophysical Property Measurement System for the Development of Advanced Materials, Energy and Biomedical Technologies	University of New South Wales/ARC LIEF Central Contribution	$600,000.00
	A Comprehensive Magneto-Thermophysical Property Measurement System for the Development of Advanced Materials, Energy and Biomedical Technologies	Australian Research Council/LIEF	$840,000.00
Sri Bandyopadhyay	Accessing the third-dimension in scanning electron microscopy for rapid, high-resolution tomography of large samples	University of New South Wales/ARC LIEF Central Contribution	$22,000.00
	Nanocomposite materials for clean energy generation, storage, savings and safety	Department of Industry, Innovation, Science, Research and Tertiary Education/Australia-India Strategic Research Fund	$109,091.00
Sushil Gupta	Effect of blending Indonesian coals in a pf boiler: Advanced coal characterization.	Pusan National University /Contract Research	$59,737.00
	Effect of coal properties on Scaffold formation in Rotary Kilns	LKAB /PhD Project	$65,000.00
	Characterisation of Australian and Indian coals and their cokes from stamp and top charged coke ovens	Australian Coal Association Research Program /Australian Coal Association Research Program	$123,250.00
Tianshu Zhang	Carbon-Free High Temperature Vacuum Sintering Facility	University of Queensland/ARC LIEF Shared Grant / Subcontract	$20,000.00
	Uni Qld Admin. State-of-art Vacuum Induction Furnace for Casting Titanium Alloys.	University of New South Wales/ARC LIEF Central Contribution	$30,000.00
	ARF - Development of High Performance Ceramic Based Thermoelectric Materials for Power Regeneration Applications	Australian Research Council/Discovery Project	$98,570.00
	Carbon-Free High Temperature Vacuum Sintering Facility	Australian Research Council/LIEF	$230,000.00
	Carbon-Free High Temperature Vacuum Sintering Facility	University of New South Wales/ARC LIEF Central Contribution	$250,000.00

CI Name	Project Title	Sponsor/Scheme Name	Awarded
Veena Sahajwalla	Use of flyash in refractories - Collaborative Research Agreement with the Vecor Companies	NewSouth Innovations/Contract Research	$4,158.00
	Recycling waste plastics in electric arc furnace steelmaking: fundamental understanding of plastics/slag interactions and slag foaming	Onesteel NSW /Onesteel NSW Pty Ltd	$25,000.00
	Recycling waste plastics in aluminium processing: Fundamental investigations of carbon/gas reactions	Rio Tinto Aluminium/ARC Linkage Project Industry Partner Contribution	$35,000.00
	The development of the Sustainability platform. Scholarship for Dongmin Jang.	Hatch Associates/Scholarship	$40,000.00
	INFRASTRUCTURE COMPONENT:Transforming industrial waste into valuable carbons for iron-carbon alloys: Fundamental investigations of structure, impurity reactions and carbon dissolution	Australian Research Council/Future Fellowship	$50,000.00
	Lower temperature ironmaking:macro and atomic-level understanding of acceleratedd carburisation of reduced iron.	Australian Research Council/Linkage Project	$55,000.00
	Novel Atomic Level Investigations of High Temperature Surface Thermodynamics of molten steel	Australian Research Council/Discovery Project	$80,000.00
	C17050 Advanced characterisation of metallurgical Coals - Coke properties and reactivity	Australian Coal Association Research Program /Coal Research Development & Demonstration	$112,500.00
	Transforming industrial waste into valuable carbons for iron-carbon alloys: Fundamental investigations of structure, impurity reactions and carbon dissolution	Australian Research Council/Future Fellowship	$172,800.00
Xuchuan Jiang	INFRASTRUCTURE COMPONENT: Synthesis and Fundamental Understanding of Low-Dimensional Metal Oxide Nanoparticles for Gas Sensing Application	Australian Research Council/Future Fellowship	$50,000.00
	Synthesis and Fundamental Understanding of Low-Dimensional Metal Oxide Nanoparticles for Gas Sensing Application	Australian Research Council/Future Fellowship	$121,600.00
	Experimental and Theoretical Studies of Vanadium Oxide Nanostructures and Their Functional Properties	Australian Research Council/Discovery Project	$150,000.00
Yuebin Zhang	Uni Wollongong Admin. A complete near-field scanning optical microscope for advanced characterisation of novel and functional materials.	University of New South Wales/ARC LIEF Central Contribution	$42,000.00
Zean Tian	RESEARCH SUPPORT: A novel method for structural analysis of amorphous system: development and application	University of New South Wales/Vice-Chancellor's Postdoctoral Fellowships	$10,000.00
Zhimin Ao	Research Support: Development of Graphene-Based Materials for Hydrogen Storage Applications	University of New South Wales/Vice-Chancellor's Postdoctoral Fellowships	$8,000.00
		Total:	$11,383,855.95

Research Publications

Book - Scholarly Research

- Bandyopadhyay, S, Hauptstein, A, & Lambino, D 2011, E-beam eformation of ceramic particles : the effect of electron irradiation on morphology, modification and microstructure of talc powder, Lambert Academic Publishing, Berlin.
- Nath, DCD, & Shiono, T 2011, Controlled Polymerization of 1,3-Butadiene, LAMBERT Academic Publishing, Germany.
- Nath, DCD, & Bandyopadhyay, S 2011, High strength polymer fly ash composites, Lambert Academic Publishing, Berlin.
- Nath, DCD, & Sahajwalla, VH 2011, Synthesis of Carbon Nanotubes, LAMBERT Academic Publishing, Germany.

Chapter - Scholarly Research

- Ao, Z, & Li, SS 2011, Applications of Al Modified Graphene on Gas Sensors and Hydrogen Storage, Physics and Applications of Graphene - Theory (pp. 133 - 174). , InTech, Vienna.
- Ao, Z, & Li, SS 2011, Hydrogenation of Graphene and Hydrogen Diffusion Behavior on Graphene/Graphane Interface, Graphene Simulation (pp. 53 - 74). , InTech, Croatia.
- Bandyopadhyay, S, & Das, M 2011, Chapter 11: Polymethyl MethacrylateCarbon Nanotube Composites, Carbon Nanotube Based Nanocomposites: Recent Development (1, pp. 335 - 360). , Research Publishing, Singapore, Singapore.
- Bandyopadhyay, S, & Srinivasan, AS 2011, Polymer Nanocomposites: from Synthesis to Applications, Nanocomposites and Polymers with Analytical Methods (1, pp. 3 - 28). , InTech Publishers, Croatia.
- Jiang, X, Yu, AB (or Yu A, or Yu A-B), Yue, J, & Kaneti, V 2011, Experimental and Theoretical Study of Low-Dimensional Iron Oxide Nanostructures, Nanoparticles/ Book1 (). , Intech Open Access Publisher.
- Khanna, R, Mahjoub, R, & Sahajwalla, VH 2011, Atomistic Monte Carlo simulations in steelmaking:high temperature carburization and decarburization of molten steel, Applications of Monte Carlo method in science and engineering (1, pp. 629 - 652). , Intech, Crotia, Rijeka, Croatia.

Journal - Refereed & Scholarly Article

- Adabifiroozjaei, E, Koshy, P, & Rastkerdar 2011, 'Effect of Different Barium Compounds on the Corrosion Resistance of Andalusite-Based Low-Cement Castables in Contact with Molten Al-Alloy', Metallurgical and Materials Transactions B - Process Metallurgy and Materials Processing Science , 42, pp. 901 - 913.
- Adabifiroozjaei, E, Koshy, P, & Rastkerdar, E 2011, 'Effects of different barium compounds on the corrosion resistance of andalusite-based low-cement castables in contact with molten Al-Alloy', Metallurgical and Materials Transactions B - Process Metallurgy and Materials Processing Science , 42, pp. 901 - 913.
- Adi, S, Adi, H, Chan, H, Finlay, WH, et al, 2011, 'Agglomerate strength and dispersion of pharmaceutical powders', Journal of Aerosol Science , 42, pp. 285 - 294.
- Adi, S, Adi, H, Chan, H, Tong, Z, et al, 2011, 'The aerosol performance of API dry powder affected by level of corrugation and impact angle', Journal of Aerosol Science , 42, pp. 285 - 294.
- Adipuri, A, Li, Y, Zhang, G, & Ostrovski, O 2011, 'Chlorination of Reduced Ilmenite Concentrates and Synthetic Rutile', International Journal of Mineral Processing , 100, pp. 166 - 171.
- Afrin, N., Quadir, MZ, Bassman, L, Driver, J, et al, 2011, 'The three-dimensional nature of microbands in a channel die compressed Goss-oriented Ni single crystal', Scripta Materialia , 64, pp. 221 - 224.
- Ahmed, M, Zhou, ZF, Munroe, PR, Li, L, & et al, 2011, 'Control of the damage resistance of nanocomposite TiSiN coatings on steels: Roles of residual stress', Thin Solid Films , 519, pp. 5007 - 5012.
- Ahmed, M, Zhao, X, Zhou, Z, Munroe, PR, et al, 2011, 'Effect of thermal annealing upon residual stress and mechanical properties of nanostructured TiSiN coatings on steel substrates', Journal of the American Ceramic Society , 94, pp. 1546 - 1551.
- Ahmed, MS, Munroe, PR, Jiang, ZT, Zhao, X, et al, 2011, 'Corrosion behaviour of nanocomposite TiSiN coatings on steel substrates', Corrosion Science , 53, pp. 3678 - 3687.
- Al-Hilli, M, Li, SS, & Kassim, K 2011, 'Gadolinium substitution and sintering temperature dependent electronic properties of Li-Ni ferrite', Materials Chemistry and Physics , 128, pp. 127 - 132.
- Al-Hilli, MF, Li, SS, & Kassim, K 2011, 'Structural analysis, magnetic and electrical properties of samarium substituted lithiumnickel mixed ferrites', Journal of Magnetism and Magnetic Materials , 324, pp. 873 -879.
- An, XZ, Yang, R, Yu, AB (or Yu A, or Yu A-B), & Dong, K 2011, 'DEM study of crystallization of monosized spheres under mechanical vibrations', Computer Physics Communications , 182, pp. 1989 - 1994. Aniss, A, Banthia, AK, Bandyopadhyay, S, & Al-zahrani , SMA 2011, 'Fabrication and characterization of novel crosslinked composite membranes for direct methanol fuel cell application-part II. Poly (Vinyl Alcohol-Co-Vinyl Acetate-Co-Itaconic Acid)/ silicotungstic acid based membranes', International Journal of Electrochemical Science , 6, pp. 2652 - 2671.
- Z, & Li, SS 2011, 'Temperature- and thickness-dependent elastic moduli of polymer thin films', Nanoscale research letters , 6, pp. 1 - 6.
- Arredondo, M, Weyland, M, Hambe, M, Ramasse, QMR, et al, 2011, 'Chemistry of RuddlesdenPopper planar faults at a ferroelectricferromagnet perovskite interface', Journal of Applied Physics , 109, pp. 084101 - 084109.
- Arsecularatne, JA, Hoffman, MJ, O'Kelly, K, & Payraudeau, N 2011, 'FIB tomographic analysis of subsurface indentation crack interactions with pores in alumina', Journal of the American Ceramic Society , 94, pp. 4017 - 4024.
- Asri idris, M, Li, SS, & Nowotny, J 2011, 'Surface Segregation in Yttria-Stabilized Zirconia (YSZ) at Elevated Temperatures', Journal of the Japanese Society for Experimental Mechanics , 11, pp. SS256 - SS260.
- Assadi, MHN, Zhang, Y, Photongkam, P., & Li, SS 2011, 'Intrinsic ambient ferromagnetism in ZnO:Co induced by Eu codoping', Journal of Applied Physics , 109, .
- Assadi, MHN, Zhang, Y, Zheng, R, Ringer, S, & et al, 2011, 'Structural and electronic properties of Eu- and Pd-doped ZnO', Nanoscale research letters , 6, pp. 357-1 - 357-7.
- Baker, I, Wu, H, Wu, X, Miller, M, & et al, 2011, 'The microstructure of near-equiatomic B2/f.c.c. FeNiMnAl alloys', Materials Characterization , 62, pp. 952 - 958.
- Bandyopadhyay, S, Sengupta, RS, Bhattacharya M, & A.K. Bhowmick 2011, 'A review on the mechanical and electrical properties of graphite and modified graphite reinforced polymer composites', Progress in Polymer Science , 36, pp. 638 - 670.
- Bandyopadhyay, S, Thomas, S, Sreekumar, PAS, & Thomas, PS 2011, 'Poly(ethylene-co-vinylacetate)/calcium phosphate nanocomposites: contact angle, diffusion and gas permeability studies', Journal of Polymer Research-Taiwan , 18, pp. 1277 - 1285.
- Belashchenko, DK, & Ostrovski, O 2011, 'Molecular dynamics simulation of shock compression of metals: Iron and iron-sulfur solutions', Russian Journal of Physical Chemistry , 85, pp. 967 - 976.
- Borrero-Lopez, OJ, Hoffman, MJ, Bendavid, A, & Martin, PJ 2011, 'Mechanical properties and scratch resistance of filtered-arc-deposited titanium oxide thin films on glass', Thin Solid Films , 519, pp. 7925 - 7931.
- Cao, C, , & Yu, AB (or Yu A, or Yu A-B) 2011, 'A novel boundary-integral based finite element method for 2D and 3D thermo-elasticity problems', Journal of Thermal Stresses , .
- Chan, SLI 2011, 'Hydrogen storage for off-grid power supply', International Journal of Hydrogen Energy , 36, pp. 654 - 663.
- Chandratilleke, GR, Yu, AB (or Yu A, or Yu A-B), Bridgwater, J, & Shinohara, K 2011, 'A
- particle-scale index in the quantification of mixing of particles', AIChE Journal , 58, pp. 1099 - 1118.
- Chen, J, Chu, K, Zou, R, Yu, AB (or Yu A, or Yu A-B), & et al, 2011, 'Prediction of the Performance of Dense Medium Cyclones in Coal Preparation', Minerals Engineering , .
- Chen, ML, Yavuz, M, & Kambe, S 2011, 'Growth kinetics and morphological transformation of Bi-2223 crystals', Solid State Communications , 151, pp. 495 - 498..
- Chen, YL, Cui, YJ, Yang, YR, Cheng, CH, & et al, 2011, 'Magnetic and transport properties of SmCoAsO1-xFx', Journal of Physics and Chemistry of Solids , 72, pp. 453 - 456.
- Chu, K, Wang, BL, Chen, Y, Chen, Y, & et al, 2011, 'CFD-DEM simulation of the gas-solid flow in a cyclone separator', Chemical Engineering Science , 66, pp. 834 - 837.

- Chu, K, Wang, B, Yu, AB (or Yu A, or Yu A-B), & Vince, A 2011, 'Particle Scale Modelling of the Multiphase Flow in a Dense Medium Cyclone: Effect of Vortex Finder Outlet Pressure', Minerals Engineering , .
- Cui, YJ, Chen, YL, Cheng, CH, Yang, YR, et al, 2011, 'Preparation of REFeAsO1-xFx (R E=Sm and Gd) superconductors at a relatively low temperature', Journal of Physics and Chemistry of Solids , 72, pp. 449- 452.
- Daniels, J, Wook Jo, Jurgen Rodel, Rietz, D, & et al, 2011, 'Structural origins of relaxor behaviour in a BNT-4%BT single crystal under electric field', Applied Physics Letters , 98, pp. 252904 - .
- Dankwah, JR, Koshy, P, Saha-Chaudhury, NM, O'Kane, P, et al, 2011, 'Reduction of FeO in EAF steelmaking slag by metallurgical coke and waste plastics blends', ISIJ International , 51, pp. 498 - 507.
- Das, M, Ray, D, Bandyopadhyay, S, Banerjee S, et al, 2011, 'Thermogravimetric and resistivity study of Ex situ and in situ poly(methyl methacrylate)/carboxylic acid group functionalized multiwall carbon nanotubes composites', Journal of Applied Polymer Science , 120, pp. 2954 - 2961.
- Dayal, P, Quadir, MZ, Kong, CH, Savvides, N., & et al, 2011, 'Transition from dislocation controlled plasticity to grain boundary mediated shear in nanolayered aluminum/palladium thin films', Thin Solid Films , 519, pp. 3213 - 3220.
- Dewan, MA, Zhang, G, & Ostrovski, O 2011, 'Carbothermal Reduction of Ilmenite Concentrates and Synthetic Rutile in Different Gas Atmospheres', Transactions of the Institution of Mining and Metallurgy Section C - Mineral Processing and Extractive Metallurgy , 120, pp. 111 - 117.
- Dittmer, R, Jo, W, Daniels, J, Schaab, S, & et al, 2011, 'Relaxor characteristics of morphotropic phase boundary (Bi 1/2Na1/2)TiO3-(Bi1/2K 1/2)TiO3 modified with Bi(Zn1/2Ti 1/2)O3', Journal of the American Ceramic Society , 94, pp. 4283 - 4290.
- Dong, K, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Numerical simulation of the particle flow and sieving behavior on sieve bend/low head screen combination', Minerals Engineering , .
- Dong, K, Yang, R, Zou, R, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Settling of particles in liquids: effects of material properties', AIChE Journal , .
- Dong, Q, Liu, X, & Zhang, T.S 2011, 'Ceramic membrane separation technique for washing nano-sized ceramic powder precursors', Particuology , 9, pp. 492 - 496.
- Downie, A, Van zwieten, L, Smernik, RJ, & Munroe, PR 2011, 'Discovering Terra Preta Australis: Rethinking temperate soils capacity to sequester carbon', Agriculture Ecosystems and Environment , 140, pp. 137- 147.
- Duggan, B, Tse, Y, Lam, G, & Quadir, MZ 2011, 'Deformation and recrystallization of interstitial free (IF) steel', Materials and Manufacturing Processes , 26, pp. 51 - 57.
- Ehara, Y, S. Yasui, Nagata, J, Kan, D, et al, 2011, 'Ultrafast switching of ferroelastic nanodomains in bilayered ferroelectric thin films', Applied Physics Letters , 99, pp. 182906 - .
- Firoozjaei, Saidi, Monshi, & Koshy, P 2011, 'Effects of Different Calcium Compounds on the Corrosion Resistance of Andalusite-Based Low-Cement Castables in Contact with Molten Al-Alloy', Metallurgical and Materials Transactions B - Process Metallurgy and Materials Processing Science , 42, pp. 400 - 411.
- Ge, W, Yu, AB (or Yu A, or Yu A-B), Yang, N, & Li, J 2011, 'Multiscale Modeling and Simulation of Complex Particulate Systems', Particuology , 9, pp. 319 - 450.
- Gheno, T, Monceau, D, Zhang, J, & Young, DJ 2011, 'Carburisation of ferritic Fe-Cr alloys by low carbon activity gases', Corrosion Science , 53, pp. 2767 - 2777.
- Guo, B, Yu, AB (or Yu A, or Yu A-B), Zulli, P, & Maldonado, D 2011, 'CFD modeling and analysis of the flow, heat transfer and mass transfer in a blast furnace hearth', Steel Research International , 82, pp. 579 - 586.
- Haberl, B, Bogle, S, Li, T, McKerracher, I, et al, 2011, 'Unexpected short- and medium-range atomic structure of sputtered amorphous silicon upon thermal annealing', Journal of Applied Physics , 110, pp. Article number: 096104 -
- Hanaor, DAH, Michelazzi, M, Veronesi, P, Leonelli, C, et al, 2011, 'Anodic Aqueous Electrophoretic Deposition of Titanium Dioxide Using Carboxylic Acids as Dispersing Agents', Journal of the European Ceramic Society , 31, pp. 1041 - 1047.
- Hanaor, DAH, Triani, G, & Sorrell, CC 2011, 'Morphology and Photocatalytic Activity of Highly Oriented Mixed Phase Titanium Dioxide Thin Films', Surface and Coatings Technology , 205, pp. 3658 - 3664.
- Hanaor, DAH, & Sorrell, CC 2011, 'Review of the Anatase to Rutile Phase Transformation', Journal of Materials Science , 46, pp. 855 - 874.
- Hanaor, DAH, Michelazzi, M, Chenu, JW, Leonelli, C, & et al, 2011, 'The Effects of Firing Conditions on the Properties of Electrophoretically Deposited Titanium Dioxide Films on Graphite Substrates', Journal of the European Ceramic Society , 31, pp. 2877 - 2885.
- Hinterstein, M, Rouquette, J, Haines, J, Papet, P, et al, 2011, 'Structural description of the macroscopic piezo- and ferroelectric properties of lead zirconate titanate', Physical Review Letters , 107, pp. Article number: 077602 - .
- Hiscocks, MP, Ganesan, K, Mckenzie, WR, Gibson, BC, et al, 2011, 'Towards characterisation of millimetre length waveguides and new fabrication method for nanoscale diamond photonic structures', Diamond and Related Materials , 20, pp. 556 - 559.
- Hoo, RP, Fratzl, P, Daniels, J, Dunlop, J, et al, 2011, 'Cooperation of length scales and orientations in the deformation of bovine bone', ACTA Biomaterialia , pp. 2943 - 2951.
- Hou, QF, Zhou, Z, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Computational study of heat transfer in a bubbling fluidized bed with a horizontal tube', AIChE Journal , .
- Huang, Y, Yao, Y, Zhang, X, Kong, C, et al, 2011, 'Role of ethanol in sodalite crystallization in an ethanol-Na 2O-Al2O3-SiO2-H2O system', CrystEngComm , 13, pp. 4714 - 4722.
- Imlao, S, Jones, J, Vodenitcharova, T, Bernier, J, & et al, 2011, 'Investigation of the domain switching zone near a crack tip in pre-poled lead zirconate titanate ceramic via in situ X-ray diffraction', Scripta Materialia , 64, pp. 1 - 4.
- Jayasundara, CT, Yang, R, Yu, AB (or Yu A, or Yu A-B), Guo, B, & et al, 2011, 'CFD-DEM modelling of particle flow in IsaMills - Comparison between simulations and PEPT measurements', Minerals Engineering , 24, pp. 181 - 187.
- Jayasundara, CT, Yang, R, Yu, AB (or Yu A, or Yu A-B), & Curry, D 2011, 'Prediction of the disc wear in a model IsaMill and its effect on the flow of grinding media', Minerals Engineering , 24, pp. 1586 - 1594.
- Jiang, Q, Yang, R, He, ZW, Liu, Z, et al, 2011, 'Preparation and characterization of a graphite electrode containing carbon nanotubes grown in situ by flame synthesis', Electrochimical ACTA , 56, pp. 5205 - 5209.
- Jiang, X, Yue, J, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Experimental and Theoretical Study on the Beta-FeOOH Nanorods: Growth and Conversion.', Journal of Nanoparticle Research , 13, pp. 3961 - 3974.
- Jiang, X, Yu, AB (or Yu A, or Yu A-B), & Yue, J 2011, 'Molecular dyamics study on the growth mechanism of goethite (a-FeOOH) nanorods', Solid State Sciences , 13, pp. 263 - 270.
- Jiang, X, Yue, J, & Yu, AB 2011, 'Molecular dynamics study on the growth mechanism of goethite (FeOOH) nanorods', Solid State Sciences , 13, pp. 263 - 270.
- Jiang, X, Chen, W.M, Chen, C, Xiong, S, & et al, 2011, 'Role of Temperature in the Growth of Silver Nanoparticles Through a Synergetic Reduction Approach', Nanoscale research letters , 6, pp. 1 - 9.
- Jiang, X, Zeng, Q, Chen, CY, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Self-assembly of particles: Some thoughts and comments', Journal of Materials Chemistry , 21, pp. 16797 - 16805.
- Jiang, X, Xiong, S, Tian Z.A., Chen, C, et al, 2011, 'Twinned Structure and Growth of V-Shaped Silver Nanowires Generated by a Polyol?Thermal Approach', Journal of Physical Chemistry C , 115, pp. 1800 - 1810.
- Kan, D, Cheng, C, Valanoor, N, & Takeuchi, I 2011, 'Composition and temperature-induced structural evolution in La, Sm, and Dy substituted BiFeO3 epitaxial thin films at morphotropic phase boundaries', Journal of Applied Physics , 110, pp. 014106 - 014113.
- Kavei, G, Nakaruk, A, & Sorrell, CC 2011, 'Equilibrium State of Anatase to Rutile Transformation for Titanium Dioxide Film Prepared by Ultrasonic Spray Pyrolysis Technique', Materials Science and Applications , 2, pp. 700 - 705.
- Khanna, R, Ikram-ul haq , M, Wang, Y, Seetharaman, S, & et al, 2011, 'Chemical interactions of alumina-carbon refractories with molten steel at 1823 K (1550 C): Implications for refractory degradation and steel quality', Metallurgical and Materials Transactions B - Process Metallurgy and Materials Processing Science , 42, pp. 677 - 684(8).
- Kongkarat, S, Khanna, R, Koshy, P, O'Kane, P, & et al, 2011, 'Use of waste bakelite as a raw material resource for recarburization in steelmaking processes', Steel Research International , 82, pp. 1228 - 1239.
- Koshy, P, Gupta, SK, Edwards, P, & Sahajwalla, VH 2011, 'Effect of BaSO4 on the interfacial phenomena of high-alumina refractories with Al-alloy', Journal of Materials Science , 46, pp. 468 - 478.
- Lai, D, Xu, J, Pan, X, Xie, Z, & et al, 2011, 'Structure-property-performance of nanocomposite Cr-Si-N films synthesized by a duplex surface treatment technique', Journal of Materials Research , 26, pp. 3020 -3031.
- Lau, K-T, & Sorrell, CC 2011, 'Electrophoretic Mobilities of Dissolved Polyelectrolyte Charging Agent and Suspended Non-Colloidal Titanium during Electrophoretic Deposition', Materials Science and Engineering B - Solid State Materials for Advanced Technology , 176, pp. 369 - 381.
- Leach S, Garcia RE, & Valanoor, N 2011, 'Edge and finite size effects in polycrystalline ferroelectrics', ACTA Materialia , 59, pp. 191 - 201.
- Li, CX, An, XZ, Yang, R, Zou, R, & et al, 2011, 'Experimental study on the packing of uniform spheres under three-dimensional vibration', Powder Technology , 208, pp. 617 - 622.
- Li, F, Pan, X, Cheng, CH, Zhou, J, et al, 2011, 'Influence of different Mg/B stoichiometry on superconductivity and flux pinning properties of MgB2 bulks', Rare Metal Materials and Engineering , 40, pp. 863 -866.
- Li, H, Zhang, J, & Young, DJ 2011, 'Oxidation of Fe-Si alloys in CO2-H2O atmospheres', Materials at High Temperatures , 28, pp. 297 - 301.
- Li, J, Zhang, G, Liu, D, & Ostrovski, O 2011, 'Low-temperature Synthesis of Aluminium Carbide', ISIJ International , 51, pp. 870 - 877.
- Lin, L, Pang, Z, Wang, F, Fang, S, et al, 2011, 'Large room-temperature magnetoresistance and temperature-dependent magnetoresistance inversion in La0.67Sr0.33MnO 3Alq3 - Co nanocomposites/Co devices', Solid State Communications , 151, pp. 734 - 737.

- Liu, P. Y., Yang, R, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Dynamics of wet particles in rotating drums: Effect of liquid surface tension', Physics of Fluids , 23, .
- Liu, Xiaozhen, Gen, J, Yu, AB (or Yu A, or Yu A-B), Wang, G, et al, 2011, 'Effect of Neodymium Salt in the Anodization of Aluminum in Sulphuric Acid', Advanced Materials Research , 415-417, pp. 1895 - 1898.
- Lu, J, Hng, H.H., Song, X, Zhang, T.S, & et al, 2011, 'Cosintering of a Bimodal pore distribution layered structure: Constitutive models and experiments', Journal of the American Ceramic Society , 94, pp. 1528 - 1535.
- Luo, Z, Glaum, J., Granzow, T., Wook Jo, et al, 2011, 'Bipolar and Unipolar Fatigue of Ferroelectric BNT-Based Lead-Free Piezoceramics', Journal of the American Ceramic Society , 94, pp. 529 - 535.
- Luo, Z, Granzow, T., Glaum, J., Wook, J, et al, 2011, 'Effect of ferroelectric long-range order on the unipolar and bipolar electric fatigue in Bi1/2Na1/2TiO3-based lead-free piezoceramics', Journal of the American Ceramic Society , 94, pp. 3927 - 3933.
- Magaraggia, Hambe, M, Kostylev, Valanoor, N, & et al, 2011, 'Probing La0.7Sr0.3MnO3 multilayers via spin wave resonances', Physical Review B , 84, pp. Art. No. 104441 - .
- Mahjoub, R, Alpay, SP, & Valanoor, N 2011, 'Comment on "Theory of Giant Electromechanical Response from Ferroelectric Bilayers with Polydomain Structures due to Interlayer and Interdomain Coupling" Reply', Physical Review Letters , 107, p. 139702.
- Mahjoub, R, Alpay, S, & Nagarajan, V 2011, 'Mahjoub, Alpay, and Nagarajan reply.', Physical Review Letters , 107, pp. rticle no. 139702 - .
- Mcelroy, LP, Bao, J, Jayasundara, CT, Yang, R, & et al, 2011, 'A Soft-Sensor Approach to Impact Intensity Prediction in Stirred Mills Guided by DEM Models', Powder Technology , 219, pp. 151 - 157.
- Mckenzie, WR, Zakaria, Q, Gass, M, & Munroe, PR 2011, 'Focused Ion Beam Implantation Of Diamond', Diamond and Related Materials , 20, pp. 1125 - 1128.
- Nath, DCD, & Sahajwalla, VH 2011, 'Application of fly ash as a catalyst for synthesis of carbon nanotube ribbons', Journal of Hazardous Materials , 192, pp. 691 - 697.
- Nath, DCD 2011, 'Fabrication of high-strength biodegradable composite films of poly (Vinyl Alcohol) and fly ash crosslinked with glutaraldehyde', International Journal of Polymeric Materials , 60, pp. 852 - 861.
- Nath, DCD, & Sahajwalla, VH 2011, 'Growth mechanism of carbon nanotubes produced by pyrolysis', Applied Physics A - Materials Science and Processing , 104, pp. 539 - 544.
- Nath, DCD, Bandyopadhyay, S, Rider, J, Yu, AB (or Yu A, or Yu A-B), et al, 2011, 'Study of dynamic mechanical properties and morphological behaviours of fly ash reinforced polypropylene composites', Macromolecular Research , 19, pp. 338 - 344.
- Ostrovski, O, Belashchenko, DK, & Mirzoev, A 2011, 'Molecular Dynamics Modelling of Liquid Fe-C Alloys', Journal of High Temperature Materials and Processes , 30, pp. 297 - 304. Othman, NK, Zhang, J, & Young, DJ 2011, 'Effect of water vapour on cyclic oxidation of Fe-Cr alloys', Materials and Corrosion - Werkstoffe und Korrosion , 62, pp. 496 - 503.
- Pan, M, Feng Ma, H, Zheng, H, & Zhao, Y 2011, 'Ab initio study of 5d-shells Ir substitution for Fe-based SmOFe 1-xIrxAs', Journal of Physics and Chemistry of Solids , 72, pp. 329 - 332.
- Pan, M, Huang, Z, Cheng, CH, Yang, XS, & et al, 2011, 'The magnetism for NN AFM ground state in Fe-based superconductor: Sr 1-xKxFe2As2', Solid State Communications , 151, pp. 667 - 670.
- Pham, A, Assadi, MHN, Zhang, Y, Yu, AB (or Yu A, or Yu A-B), & et al, 2011, 'Weak d0 magnetism in C and N doped ZnO', Journal of Applied Physics , 110, pp. 123917 - .
- Pojprapai, S, Simons, H, Luo, Z, & Hoffman, MJ 2011, 'Temperature dependence on domain switching behavior in lead zirconate titanate under electrical load via in situ neutron diffraction', Journal of the American Ceramic Society , 94, pp. 3202 - 3205.
- Pramanick, A, Damjanovic, D, Daniels, J, Nino, J, & et al, 2011, 'Origins of Electro-Mechanical Coupling in Polycrystalline Ferroelectrics During Subcoercive Electrical Loading', Journal of the American Ceramic Society , 94, pp. 293 - 309.
- Quadir, MZ, Al-Buhamad, OH, & Ferry, M 2011, 'The Mechanical Performance of ARB Fabricated Hybrid Lamellar Composite of Recovered/Recrystallized Al and Precipitation Hardened Al(Sc) Layers', Materials Science Forum , 667-669, pp. 481 - 486.
- Quadir, MZ, Ferry, M, & Munroe, PR 2011, 'The initial stages of formation of low angle boundaries within lamellar bands during accumulative roll bonding of aluminum', Scripta Materialia , 64, pp. 1106 - 1109.
- Rahman, MM, Shinohara, K, Zhu, HP, Yu, AB (or Yu A, or Yu A-B), & et al, 2011, 'Size segregation mechanism of binary particle mixture in forming a conical pile', Chemical Engineering Science , 66, pp. 6089 - 6098.
- Rama Krishnan, P. S., Arredondo, MA, Saunders, M., Ramasse, Q. M., et al, 2011, 'Microstructural analysis of interfaces in a ferromagnetic-multiferroic epitaxial heterostructure', Journal of Applied Physics , 109, .
- Rezan, SA, Zhang, G, & Ostrovski, O 2011, 'Carbothermal Reduction and Nitridation of Titanium Dioxide in the H2-N2 Gas Mixture', Journal of the American Ceramic Society , 94, pp. 3804 - 3811.
- Rezan, SA, Zhang, G, & Ostrovski, O 2011, 'Effect of Gas Atmosphere on Carbothermal Reduction and Nitridation of Titanium Dioxide', Metallurgical and Materials Transactions B - Process Metallurgy and Materials Processing Science , .
- Royles, A, Bell, A, Daniels, J, Milne, S, & et al, 2011, 'Observation of a time-dependent structural phase transition in potassium sodium bismuth titanate', Applied Physics Letters , 98, pp. 182904 - .
- Sahajwalla, VH, Zaharia, M, Rahman, MM, Khanna, R, et al, 2011, 'Recycling rubber tyres and waste plastics in EAF steelmaking', Steel Research International , 82, pp. 566 - 572.
- Saunders, M., Kong, C, Shaw, J, & Clode, P 2011, 'Matrix-mediated biomineralization in marine mollusks: A combined transmission electron microscopy and focused ion beam approach', Microscopy and Microanalysis , 17, pp. 220 - 225.
- Shen, Y, Yu, AB (or Yu A, or Yu A-B), & Zulli, P 2011, 'CFD modelling and analysis of pulverized coal injection in blast furnace: An overview', Steel Research International , 82, pp. 532 - 542.
- Shen, Y, Yu, AB (or Yu A, or Yu A-B), Austin, P, & Zulli, P 2011, 'CFD study of in-furnace phenomena of pyulverized coal injection in blast furnace: effects of operating conditions', Powder Technology , 223, pp. 27 - 38.
- Shen, Y, Yu, AB (or Yu A, or Yu A-B), Austin, P, & Zulli, P 2011, 'Modelling in-furnace phenomena of pulverized coal injection in ironmaking blast furnace: Effect of coke bed porosities', Minerals Engineering , pp. 1- 12.
- Shen, Y, Guo, B, Yu, AB, Austin, P, & et al, 2011, 'Three-dimensional modelling of in-furnace coal/coke combustion in a blast furnace', Fuel, the science and technology of fuel and energy , 90, pp. 728 - 738.
- Sim, D, Liu, D, Dong, X, Ni, X, et al, 2011, 'Power factor enhancement for few-layered grapheme films by molecular attachments', Journal of Physical Chemistry C , 115, pp. 1780 - 1785.
- Simons, H, Daniels, J, Wook Jo, Dittmer, R, et al, 2011, 'Electric-Field Induced Strain Mechanisms in Lead-Free 94%(Bi0.5Na0.5)TiO3-6%BaTiO3', Applied Physics Letters , 98, pp. Article number 082901 - .
- Song, X, Lu, J, Zhang, T.S, & J Ma 2011, 'Two-stage master sintering curve approach to sintering kinetics of undoped and Al2O3-doped 8 Mol% yttria-stabilized cubic zirconia', Journal of the American Ceramic Society , 94, pp. 1053 - 1059.
- Song, XC, Lu, J, Zhang, T.S, & Ma, J 2011, 'Sintering behavior and mechanisms of NiO-doped 8 mol% yttria stabilized zirconia', Journal of the European Ceramic Society , 31, pp. 2621 - 2627. Steuwer, A, & Daniels, J 2011, 'In-situ stress and strain measurements around cracks using synchrotron X-ray diffraction', Journal of Strain Analysis for Engineering Design , 46, pp. 593 - 606.
- Tang, G, Hoffman, MJ, Yan, J, Zakaria, Q, & et al, 2011, 'Fatigue crack growth in ultrafine grained aluminium alloy', Materials Science Forum , .
- Tay, YY, Tan, T, & Li, SS 2011, 'Determinants of the structured and structureless green emissions of ZnO', Solid State Communications , 151, pp. 372 - 376.
- Tian Z.A., Liu, RS, Dong, KJ, & Yu, AB (or Yu A, or Yu A-B) 2011, 'A new method for analyzing the local structures of disordered systems', Europhysics Letters , 96, pp. Article number 36001 - .
- Tong, Z, Adi, S, Yang, R, Chan, H, & et al, 2011, 'Numerical investigation of the de-agglomeration mechanisms of fine powders on mechanical impaction', Journal of Aerosol Science , 42, pp. 811 - 819.
- Torres-Rojas, D, Lehmann, J, Hobbs, PR, Joseph, S, & et al, 2011, 'Biomass availability, energy consumption and biochar production in rural households of Western Kenya', Biomass and Bioenergy , 35, pp. 3537 - 3546.
- Tsai, HP, Zhang, T.S, Donelson, R, Li, SS, & et al, 2011, 'Power factor enhancement in Zn-doped Na0.8CoO2', Journal of Alloys and Compounds , 509, pp. 5183 - 5186.
- Vasudevan, R., Chen, Y, Tai, H, Balke, N, et al, 2011, 'Exploring Topological Defects in Epitaxial BiFeO3 Thin Films', ACS Nano , 5, pp. 879 - 887.
- Vasudevan, R., Bogle, KA, Kumar, A, Jesse, S, et al, 2011, 'Ferroelectric and electrical characterization of multiferroic BiFeO3 at the single nanoparticle level', Applied Physics Letters , 99, pp. 252905 - 252908.
- Vasudevan, R., Liu, Y, Li, J, Liang, W, et al, 2011, 'Nanoscale control of phase variants in strain-engineered BiFeO3', Nano Letters , 11, pp. 3346 - 3354.
- Ventura, T, Cho, YH, Kong, C, & Dahle, AK 2011, 'Formation of intermetallics in Sn-0.9Cu and Sn-0.7Cu-0.08Ni solders', Journal of Electronic Materials , 40, pp. 1403 - 1408.
- Wang, D, Li, SS, Chan, H. L. W., & Choy, C 2011, 'Electro-Optic characterization of epitaxial and Ba0.7Sr0.3TiO3 thin films using prism coupling technique', Current Applied Physics , 11, pp. S52 - S55.
- Wang, DY, Lin, DM, Kwok, KW, Chan, N., et al, 2011, 'Ferroelectric, piezoelectric, and leakage current properties of (K 0.48Na0.48Li0.04)(Nb0.775Ta 0.225)O3 thin films grown by pulsed laser deposition', Applied Physics Letters , 98, pp. 022902 - .
- Wang, DY, Chan, NY, Zheng RK, Kong, CH, et al, 2011, 'Multiferroism in orientational engineered (La, Mn) co-substituted BiFeO3 thin films', Journal of Applied Physics , 109, pp. Article number: 114105 - .
- Chemphyschem , 12, pp. 3614 - 3618.

- Wang, M, Yang, R, & Yu, AB (or Yu A, or Yu A-B) 2011, 'DEM investigation of energy distribution and particle breakage in tumbling ball mills', Powder Technology , pp. 83 - 91.
- Wang, W, Pu, MH, Wang, W, Lei, M, et al, 2011, 'Improved flux-pinning properties of REBa2Cu3O 7-z films by low-level Co doping', Physica Status Solidi A: Applications and Materials Science , 208, pp. 2166 - 2169.
- Wiogo, H, Lim, M, Munroe, PR, & Amal, R 2011, 'Understanding the formation of iron oxide nanoparticles with acicular structure from iron (III) chloride and hydrazine monohydrate', Crystal Growth and Design , 11, pp. 1689 - 1696.
- Wo, P, Munroe, PR, Xie, Z, Zhou, Z, & et al, 2011, 'Three-dimensional visualization of scratch-induced subsurface damage in TiSiN/TiN multilayer coating using focused ion beam-scanning electron microscopic tomography technique', Journal of the American Ceramic Society , 94, pp. 1598 - 1604.
- Wong, K, Zeng, Q, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Atomic and electronic structures of M (=Ni, Fe, NiFe, or FeNi) adlayer-modified á-Al2O3(0001) catalyst interface', Journal of Physical Chemistry C , 115, pp. 13796 - 13803.
- Wong, K, Zeng, Q, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Electronic structure of metal (M = Au, Pt, Pd, or Ru) bilayer modified Fe2O3(0001) surfaces', Journal of Physical Chemistry C , 115, pp. 4656 - 4663.
- Wong, K, Zeng, Q, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Interfacial synergistic effect of the Cu monomer or CuO dimer modified CeO2(111) catalyst for CO oxidation', Chemical Engineering Journal , 174, pp. 408 - 412.
- Wook Jo, Daniels, J, Jones, J, Tan, X, et al, 2011, 'Evolving Morphotropic Phase Boundary in Lead-Free Bi0.5Na0.5)TiO3 BaTiO3 Piezoceramics', Journal of Applied Physics , 109, pp. 014110 - .
- Wu, Q, Zhang, J, & Young, DJ 2011, 'Metal dusting behaviour of several nickel- and cobalt-base alloys in CO-H2-H2O atmosphere', Materials and Corrosion - Werkstoffe und Korrosion , 62, pp. 521 - 530.
- Xie, D, Jiang, Q, Fu, G, Ding, Y, et al, 2011, 'Preparation of cotton-shaped CNT/PANI composite and its electrochemical performances', Rare Metals , 30, pp. 94 - 97.
- Xiong, S, Chen, CY, Chen, W.M, Jiang, X, & et al, 2011, 'Polyol-thermal synthesis of silver nanowires for Hg2+ sensing detection', Journal of Nanoparticle Research , 13, pp. 5087 - 5101.
- Xu, J, Mao, X, Munroe, PR, & Xie, Z 2011, 'Damage-tolerant, hard nanocomposite coatings enabled by a hierarchical structure', Journal of Physical Chemistry C , 115, pp. 18977 - 18982.
- Xu, J, Xie, Z, & Munroe, PR 2011, 'Effect of Cr alloying on friction and wear of sputter-deposited nanocrystalline (MoxCr1-x)1.5Si3 films', Intermetallics , 19, pp. 1146 - 1156.
- Yan, X, Zou, C., Chen, R., Li, SS, et al, 2011, 'Conversion Process of ZnO Nano-/Micro-Rods into Nano-/Micro-Tubes and Cathodoluminescence Characterization', Journal of Nanoscience and Nanotechnology , 11, pp. 3711 - 3715.
- Yang, C, & Li, SS 2011, 'Basic Principles for Rational Design of High Performance Nanostructured Silicon-Based Thermoelectric Materials', Chemphyschem , 12, pp. 3614 - 3618.
- Yang, C, & Li, SS 2011, 'Size-, dimensionality-, and composition-dependent Debye temperature of monometallic and bimetallic nanocrystals in the deep nanometer scale', Physica Status Solidi B - Basic Solid State Physics , 248, pp. 1375 - 1378.
- Yang, C, & Li, SS 2011, 'Size-dependent lattice thermal conductivity of nanostructured bulk semiconductors', Journal of Electronic Materials , 40, pp. 953 - 956.
- Yang, J, Zhang, Y, & Li, SS 2011, 'Structure, stability and magnetism of cobalt doped (ZnO)n clusters.', Journal of Nanoscience and Nanotechnology , 11, pp. 2564 - 2569.
- Yang, L, Yang, X, Lv, LX, Cheng, CH, & et al, 2011, 'Microstructure and transport properties in tin boned La 0.7Sr0.3MnO3 composites', Journal of superconductivity and novel magnetism , 24, pp. 1847 - 1851.
- Yang, N, Ge, W, Li, J, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Foreword', Particuology , 9, p. 319.
- Yang, YR, Wang, L, Sun, H, Cheng, CH, & et al, 2011, 'Effect of polymers doping on flux pinning behavior of MgB2', Journal of Physics and Chemistry of Solids , 72, pp. 593 - 596.
- Yi, LY, Dong, K, Zou, R, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Coordination number of the packing of ternary mixtures of spheres: Dem simulations versus measurements', Industrial and Engineering Chemistry Research , 50, pp. 8773 - 8785.
- Young, DJ, Naumenko, D, Wessel, E, Singheiser, LA, & et al, 2011, 'Effect of Zr additions on the oxidation kinetics of FeCrAlY alloys in low and high pO2 gases', Metallurgical and Materials Transactions A - Physical Metallurgy and Materials Science , 42, pp. 1173 - 1183.
- Young, DJ, Zhang, J, & Speck, P 2011, 'Influence of hafnium additions and preoxidation on metal dusting of Ni-Al alloys', Oxidation of Metals , 76, pp. 167 - 187.
- Young, DJ 2011, 'Predicting internal oxidation: building on the Wagner model', Materials Science Forum , 696, pp. 1 - 11.
- Young, DJ, Zhang, J, Geers, C, & Schutz, M 2011, 'Recent Advances in Understanding Metal Dusting - A Review', Materials and Corrosion - Werkstoffe und Korrosion , 62, pp. 7 - 28.
- Young, DJ, Zurek, J, Singheiser, L, & Quadakkers, WJ 2011, 'Temperature dependence of oxide scale formation on high-Cr ferritic steels in Ar-H2-H2O', Corrosion Science , 53, pp. 2131 - 2141.
- Yu, AB (or Yu A, or Yu A-B), Wang, B, Chu, K, Vince, A, et al, 2011, 'Computational study of the multiphase flow and performance of dense medium cyclones: effect of body dimensions,', Minerals Engineering ,24, pp. 19 - 34.
- Yu, AB (or Yu A, or Yu A-B), Jayasundara, CT, & Yang, R 2011, 'Effect of the size of media on grinding performance in stirred mills', Minerals Engineering
- Yu, AB (or Yu A, or Yu A-B), Wright, B, Zulli, P, & Zhou, Z 2011, 'Gas-Solid Flow in an Ironmaking Blast Furnace - I: Physical Modelling', Powder Technology , 208, pp. 86 - 97.
- Yu, AB (or Yu A, or Yu A-B), , Guo, Z.L., Zhu, G.S., et al, 2011, 'MnO2 Film with 3D structure prepared by hydrothermal process for supercapacitor', Journal of Power Sources , 199, pp. 409 - 412.
- Yu, AB (or Yu A, or Yu A-B), Hou, Q, & Hou, Q 2011, 'Particle Scale Simulation of Heat Transfer in Fluid Bed Reactors', Intech , Chapter 15, pp. 383 - 408.
- Yu, J, Yin, F, Wang, S, Chang, L, & et al, 2011, 'Sulfur removal property of activated-char supported Fe-Mo sorbents for integrated cleaning of hot coal gases', Fuel , .
- Yue, J, Jiang, X, & Yu, AB (or Yu A, or Yu A-B) 2011, 'A Molecular Dynamics Study on Au/Fe3 04 Nanocomposites and their Surface Function towards Amino Acids', Journal of Physical Chemistry B , 115, pp. 11693 - 11699.
- Yue, J, Jiang, X, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Experimental and theoretical study on the a-FeOOH nanorods: growth and conversion', Journal of Nanoparticle Research , 13, pp. 3961 - 3974.
- Yue, J, Jiang, X, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Molecular dynamics study on Au/Fe3O4 nanocomposites and their surface function toward amino acids', Journal of Physical Chemistry B , 115, pp. 11693 - 11699
- Yunos, NFM, Ahmad, K, Zaharia, M, & Sahajwalla, VH 2011, 'Combustion of Agricultural Waste and Coke Blends during High Temperature Processes: The Effect of Physical, Chemical and Surface Properties', Journal of the Japanese Society for Experimental Mechanics , 11, pp. 261 - 266.
- Yunos, NFM, Zaharia, M, Ahmad, K, Nath, DCD, et al, 2011, 'Structural transformation of agricultural waste/coke blends and their implications during high temperature processes', ISIJ International , 51, pp. 1185 - 1193.
- Zatryb, G, Podhorodecki, A, Hao, X, Misiewicz, J, et al, 2011, 'Correlation between stress and carrier nonradiative recombination for silicon nanocrystals in an oxide matrix', Nanotechnology , 22, pp. 335703 - .
- Zavgorodniy, AV, Borrero-Lopez, OJ, Hoffman, MJ, Legeros, RZ, & et al, 2011, 'Characterization of the chemically deposited hydroxyapatite coating on a titanium substrate', Journal of Materials Science – Materials in Medicine , 22, pp. 1 - 9.
- Zavgorodniy, AV, Borrero-Lopez, O, Hoffman, MJ, Legeros, RZ, & et al, 2011, 'Mechanical stability of two-step chemically deposited hydroxyapatite coating on Ti substrate: Effects of various surface pretreatments', Journal of Biomedical Materials Research Part B - Applied Biomaterials , 99B, pp. 58 - 69.
- Zednik, RJ, Varatharajan, A, Oliver, M, Valanoor, N, & et al, 2011, 'Mobile ferroelastic domain walls in nanocrystalline PZT films: The direct piezoelectric effect', Advanced Functional Materials , 21, pp. 3104 - 3110.
- Zhang, Y, Chen, YL, Cheng, CH, Cui, YJ, & et al, 2011, 'Metal-insulator transition and superconductivity in Hg-doped BaPb 0.75Bi0.25O3', Journal of Physics and Chemistry of Solids , 72, pp. 597 - 600.
- Zhang, Y, Assadi, MHN, & Li, SS 2011, 'Structural and magnetic stability of dopants in ZnO-based dilute magnetic semiconductors', Journal of Physics: Condensed Matter , 23, .
- Zhao, X, Xie, Z, & Munroe, PR 2011, 'Nanoindentation of hard multilayer coatings: Finite element modelling', Materials Science and Engineering A - Structural Materials Properties Microstructure and Processing , 528, pp. 1111 - 1116.
- Zheng, Q, Zhu, HP, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Finite element analysis of the rolling friction of a viscous particle on a rigid plane', Powder Technology , 207, pp. 401 - 406.
- Zhou,X, Luo, Z, Han, L, Zou, Z, & et al, 2011, 'Study on the COREX Melter Gasifier Zones Using Temperature Gradient', Advanced Materials Research , 284-286, pp. 1184 - 1190.
- Zhou, Z,Yu, AB (or Yu A, or Yu A-B), & Choi, SK 2011, 'Numerical simulation of the liquid-induced erosion in a weakly bonded sand assembly', Powder Technology , 211, pp. 237 - 249.
- Zhou, Z.Y., Pinson, D, Zou, R, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Discrete particle simulation of gas fluidization of ellipsoidal particles', Chemical Engineering Science , 66, pp. 6128 - 6145.
- Zhou, Z.Y., Zou, R, Pinson, D, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Dynamic simulation of the packing of ellipsoidal particles', Industrial and Engineering Chemistry Research , 50, pp. 9787 - 9798.
- Zhou, Z.Y., Zhu, H, Wright, B, Yu, AB (or Yu A, or Yu A-B), & et al, 2011, 'Gas-solid flow in an ironmaking blast furnace-II: Discrete particle simulation', Powder Technology , 208, pp. 72 - 85.
- Zhu, HP, Zhou, Z.Y., Hou, QF, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Linking discrete particle simulation to continuum process modelling for granular matter: Theory and application', Particuology , 9, pp. 342 -357.
- Zhu, Q, Zhu, HT, Tieu, AK, & Kong, C 2011, 'Three dimensional microstructure study of oxide scale formed on a high-speed steel by means of SEM, FIB and TEM', Corrosion Science , 53, pp. 3603 - 3611.

- Zou, R, Gan, M, & Yu, AB (or Yu A, or Yu A-B) 2011, 'Prediction of the porosity of multi-component mixtures of cohesive and non-cohesive particles', Chemical Engineering Science , 66, pp. 4711 - 4721.

Conference - Full Paper Refereed

- Assadi, MHN, Zhang, Y, & Li, SS 2011, 'The role of unintentional hydrogen on magnetic properties of Co doped ZnO', 30th International Conference on the Physics of Semiconductors, Seoul, South Korea, 25-30 July 2010, .
- Bandyopadhyay, S, Moran, G, & MR Mada 2011, 'Crosslinked PVA -CNT nanocomposites', International Conf on Nano-electronics, Salem India, Feb 24-26, 2011, .
- Calvert, K, Trumble, K, Chandrasekar, S, & Hoffman, MJ 2011, 'Ultrafine-grained commercially pure titanium and microstructure response to hydroxyapatite coating methods', Biomaterials Science-Processing, Properties, and Applications - Materials Science and Technology 2010 Conference and Exhibition, MS and T'10, Houston, TX, United States, 17-22 October, 2010, .
- Chen, WM, Jiang, X, Yavuz, M, & Kambe, S 2011, 'Development of Avrami's kinetics to describe growth of Bi-2223 crystals', IEEE International Conference on Applied Superconductivity and Electromagnetic Devices, Sydney, 14-16 December 2011, .
- Chen, WM, Yavuz, M, Fu, XK, Kambe, S, et al, 2011, 'Development of continuous wrapping tantalum barriers for internal-tin Nb3Sn multi-filamentary wires', IEEE International Conference on Applied Superconductivity and Electromagnetic Devices, Sydney, 14-16 December 2011, .
- Gheno, T, Zhang, J, & Young, DJ 2011, 'HIGH TEMPERATURE CORROSION OF CHROMIA-FORMING ALLOYS UNDER OXYFUEL FIRING CONDITIONS', 18th International Corrosion Congress , Perth Australia, 20-24 November 2011, .
- Goon, IY, Lai, LMH, Lim, M, Leech, D, et al, 2011, 'Thiol Functionalisation of Gold-Coated Magnetic Nanoparticles: Enabling the Controlled Attachment of Functional Molecules', Chemeca 2010: The 40th Annual Australasian Chemical and Process Engineering Conference, Adelaide, South Australia, 26-29 September 2010, .
- Guo, B, Yu, AB (or Yu A, or Yu A-B), Zulli, P, & Maldonado, D 2011, 'Numerical modeling of multiphase flow, heat transfer and titanium flow behavior in blast furnace hearth', 4th Baosteel Biennial Academic Conference, Shanghai, China, 16-18 November, 2010, .
- Gupta, B, Rouesnel, W, Goon, IY, Amal, R, & et al, 2011, 'DNA hybridization for nanocube functionalization', 2010 3rd International Conference on Nanoscience and Nanotechnology, ICONN 2010, Sydney, NSW, Australia, 22-26 February, 2010, .
- Jang, D, Gupta, Sushil, Freislich, M, Bhushan, B, & et al, 2011, 'Carbothermic reduction and carburization behavior of iron ore carbon composite', AISTech 2011 Iron and Steel Technology Conference, Indianapolis, IN, United States, 2-5 May, 2011, .
- Jiang, Q, Yang, R, He, ZW, Huang, B, & et al, 2011, 'Detection trace copper by carbon nanotube chemically modified electrode via flame synthesis', 11th IUMRS International Conference in Asia, IUMRS-ICA2010, Qingdao, China, 25-28 September, 2010, .
- Jiang, Q, Xie, D, Fu, G, Huang, B, et al, 2011, 'Effects of the CNT on the preparation and electrochemical performances of the CNT / PANI hollow sphere composite', 11th IUMRS International Conference in Asia, IUMRS-ICA2010, Qingdao, China, 25-28 September, 2010,
- Jiang, Q, Yang, R, Fu, G, Xie, D, et al, 2011, 'Preparation of the carbon nanotube / carbon fiber composite and application as the electrode material of the electrochemical super capacitor', 11th IUMRS International Conference in Asia, IUMRS-ICA2010, Qingdao, China, 25-28 September, 2010, .
- Kemal, I, Whittle, A, Burford, RP, Vodenitcharova, T, & et al, 2011, 'PVC-CaCO3 Nanocomposites produced by an in-situ coupling with titanate coupling agent using twin-screw extruder', 69th Annual Technical Conference of the Society of Plastics Engineers 2011, ANTEC 2011, Boston, MA, United States, 1-5 May, 2011, .
- Li, H, Munroe, PR, Zhang, J, & Young, DJ 2011, 'THE TRANSITION FROM INTERNAL TO PROTECTIVE OXIDATION DURING OXIDATION OF DILUTE FE-AL ALLOYS IN AR-20% CO2', 18th International Corrosion Congress, Perth Australia, 20-24 November 2011,
- Li, Y, Pownceby, M, Zhang, G, Kong, CH, et al, 2011, 'Characterization and Carbothermal Reduction of a Murray Basin Ilmenite Concentrate', The 8th International Heavy Minerals Conference, Perth, 5-6 October 2011, .
- Mulaudzi, F, Cornish, L, Slabbert, G, Mahlangu, F, & et al, 2011, 'ON THE METAL DUSTING CORROSION OF ALLOY 800 FERRULES IN A PETROCHEMICAL ENVIRONMENT', 18th International Corrosion Congress, Perth Australia, 20-24 November 2011, .
- Pham, H.C., Hanaor, DAH, Cox, J, & Sorrell, CC 2011, 'Nanocrystalline TiO2 Thin Films on Poly(Ethylene Terephthalate) at ?130C', Materials Innovation in Surface Engineering, Melbourne, 18-20 October 2011, .
- Sahajwalla, VH, Zaharia, M, Kongkarat, S, Khanna, R, et al, 2011, 'Recycling Polymeric Materials for Slag /Carbon Interactions in EAF Steelmaking', COM 2011, Montreal, Canada, 2-5 October 2011, .
- Sahajwalla, VH, Zaharia, M, Jang, D, Dankwah, J, et al, 2011, 'Recycling waste polymers in iron oxide composite pellets for ironmaking', AISTech 2011 Iron and Steel Technology Conference, Indianapolis, IN, United States, 2-5 May, 2011, .
- Tjakra, JD, Bao, J, Hudon, N, & Yang, R 2011, 'Characterization of Drum Mixer Flow Regimes Using Markov Chains', Chemeca 2011, Sydney, 18-21 September 2011, .
- Tong, Z, Yang, R, Yu, AB (or Yu A, or Yu A-B), Adi, S, & et al, 2011, 'Particle scale study of the dispersion of dry powder in pharmaceutical aerosol inhalers', 2011 AIChE Annual Meeting, 11AIChE, Minneapolis, MN, United States, 16-21 October, 2011, .
- Wang, D, Chan, N., R.K. Zheng, Kong, C, et al, 2011, 'Orientational dependence of multiferroic behaviors of La and Mn modified BiFeO3 thin films', 2011 International Symposium on Applications of Ferroelectrics and 2011 International Symposium on Piezoresponse Force Microscopy and Nanoscale Phenomena in Polar Materials, ISAF/PFM 2011, Vancouver, BC, 24-27 July, 2011, .
- Wechsler, A, Ramirez, MJ, Crosky, AG, Zaharia, M, et al, 2011, 'Sustainable furniture panel composites from forestry and food industry by-products in Australia', First International Postgraduate Conference on Engineering, Designing and Developing the Built Environment for Sustainable Wellbeing, Brisbane, 27-29 Apr 2011, .
- Yang, W.J., Zhou, Z.Y., Yu, AB (or Yu A, or Yu A-B), & Pinson, D 2011, 'A three-dimensional sector model for solid flow in a blast furnace', Chemeca2011, Sydney, September 18-21, .
- Ye, Z, Gupta, Sushil, Kerkkonen, O, Kanniala, R, & et al, 2011, 'Transformation of silicon-bearing coke minerals in blast furnace', AISTech 2011 Iron and Steel Technology Conference, Indianapolis, IN, United States, 2-5 May, 2011, .
- Yunos, N, Ahmad, K, Zaharia, M, & Sahajwalla, VH 2011, 'Agricultural wastes - A resource for EAF steelmaking', AISTech 2011 Iron and Steel Technology Conference, Indianapolis, IN, United States, 2-5 May, 2011, .
- Zhang, J, Othman, NK, & Young, DJ 2011, 'WATER VAPOUR EFFECT ON CYCLIC OXIDATION OF FE-CR ALLOYS AT 950XC', 18th International Corrosion Congress , Perth Australia, 20-24 November 2011, .
- Zhou, Z.Y., Liu, S.D., Zou, R, Pinson, D, & et al, 2011, 'Piling and hopper flow of ellipsoidal particles A comparison with spheres', Chemeca2011, Sydney, September 18-21, .