



7-9 April 2015, Sydney

Conference Program



*Efficiency to Effectiveness:
Sustainability in Manufacturing*

The 22nd CIRP Conference
On Life Cycle Engineering





Welcome Address

Dear colleagues and friends,

On behalf of the organising committee, I would like to welcome you to the 22nd CIRP Conference on Life Cycle Engineering 2015. Our research group, Sustainable Manufacturing and Life Cycle Engineering at The University of New South Wales, is very proud to host this event.

I would like to acknowledge all the authors who have submitted papers to this conference. We have received a record number of abstract and full paper submissions, resulting in a full 3-day program covering every aspect of life cycle engineering. Our sincere thanks go out to the scientific committee members who reviewed the papers over their precious Christmas and New Year holidays.

Also, we thank Arinex and all our volunteers for ensuring the conference was organised smoothly.

We would also like to show our appreciation for our valuable supporters and sponsors who made the conference feasible.

Last but not least, I would like to sincerely thank all the delegates for attending the conference. We are delighted to welcome you to this international platform for the exchange of ideas in the relaxed autumn environment of Sydney.

Professor Sami Kara

Content

Committee List	1
SMLCE@UNSW	2
ENG@UNSW	3
Sponsors & Supporters	4
Social Program	5
Venue Floor Plan	6
Program Overview	7
Day 1 Program	8
Day 2 Program	12
Day 3 Program	16
Session Chair	20



**Sustainable Manufacturing and Life Cycle
Engineering Research Group**

**School of Mechanical and Manufacturing
Engineering**

The University of New South Wales

www.lceresearch.unsw.edu.au

Organising Committee

Chairman

Professor Sami Kara

Co-Chairman

Dr Wen Li

Members

Dr Supachai Vongbunyong

Dr Suphunnika Ibbotson

Scientific Committee

Prof. L. Alting / DK	Prof. C. Luttrupp / SE
Prof. O. Battaïa / FR	Prof. P. Mativenga / UK
Prof. A. Bernard / FR	Prof. N. Nasr / US
Prof. F. Badurdeen / US	Prof. A. Nee / SG
Prof. G. Byrne / IE	Prof. R. Neugebauer / DE
Dr T. Dettmer / DE	Prof. S.K. Ong / SG
Prof. W. Dewulf / BE	Prof. M. Overcash / US
Dr M. Doolan / AU	Prof. S. Rahimifard / UK
Prof. D. Dornfeld / US	Prof. G. Reinhart / DE
Prof. J. Duflou / BE	Mr R. Rouwette / AU
Prof. H. ElMaraghy / CA	Prof. K. S. Sangwan / IN
Mr T. Grant / AU	Prof. G. Seliger / DE
Prof. K. Haapala / US	Prof. W. Sihn / AT
Prof. M. Hauschild / DK	Prof. S. Skerlos / US
Prof. C. Herrmann / DE	Dr B. Song / SG
Dr J.A. Howarter / US	Prof. R. Steinhilper / DE
Dr S. Ibbotson / AU	Prof. J. Sutherland / US
Prof. I.S. Jawahir / US	Prof. S. Takata / JP
Prof. J. Jeswiet / CA	Dr S. Thiede / DE
Prof. H. Kaebnick / AU	Prof. E. Uhlmann / DE
Prof. S. Kara / AU	Prof. Y. Umeda / JP
Dr S.J. Kim / AU	Prof. F. van Houten / NL
Prof. F. Kimura / JP	Dr S. Vongbunyong / AU
Ms S. King / AU	Dr R. S. Wadhwa / NO
Prof. G. Lanza / DE	Prof. E. Westkämper / DE
Dr W. Li / AU	Prof. C. Yuan / US
Dr B.S. Linke / DE	Prof. P. Zwolinski / FR
Prof. E. Lutters / NL	



About Us

The Sustainable Manufacturing and Life Cycle Engineering Research Group (SMLCE@UNSW) was established in 1998 under the former name, “Life Cycle Engineering and Management Research Group”, within the School of Mechanical and Manufacturing Engineering, The University of New South Wales, Australia. Over the last two decades, the research group has graduated over 30 postgraduate research students, attracted more than \$10 million in research funding, and generated over 200 scientific publications.



Research Highlights

Led by Prof. Kara, SMLCE@UNSW conducts research in diverse areas of Life Cycle Engineering: including (1) eco-design, (2) low carbon manufacturing, energy and resource efficiency in manufacturing, (3) carbon footprint assessment, (4) life cycle assessment (LCA) and life cycle costing (LCC), (5) sustainable supply chain management, and (6) end-of-life product treatment. To name a few research projects:

- Sustainability Cockpit: an integrated tool for assessment and improvement of sustainability in manufacturing *[Funded under the ARC Linkage program with 4 industry partners]*
- Energy and water efficiency in Australia manufacturing *[Funded under the ARC linkage program with Baxter Healthcare Australia]*
- Energy and eco-efficiency of manufacturing processes *[Funded by Advanced Manufacturing Cooperative Research Centre]*
- Composites: calculating their embodied energy study *[Funded by the State of Queensland]*
- Lifetime prediction of industrial products for re-use *[Funded under the ARC Discovery program]*

Collaborations

SMLCE@UNSW has established close collaborations and partnerships with governments, industries, professional associations, and international institutes, such as the State of Queensland, Western Sydney Business Connection, Baxter Healthcare, Boeing Research & Technology Australia (BR&T), and ifu Hamburg. The Joint German-Australian Research Group in Sustainable Manufacturing and Life Cycle Management (JGARG) was established with the funding support of Germany’s Federal Ministry of Education and Research in 2009. The JGARG combines the life cycle engineering capabilities of UNSW and Technische Universität Braunschweig, and has already produced over 20 joint publications. A number of joint research projects have been further established and conducted with the support from multinational manufacturers, ARC, and Go8-DAAD.



Joint German-Australian Research Group
Sustainable Manufacturing and Life Cycle Management
Technische Universität Braunschweig – The University of New South Wales, Sydney



The Faculty of Engineering at UNSW Australia is renowned as a leader in engineering throughout the world.

In cutting-edge research, and innovative and industry-relevant teaching, it is a worldwide hub, attracting international collaborations and students from across the globe.

We are the largest engineering faculty in Australia, with some 10,000 students enrolled in 2014, 3,000 of whom are postgraduate and more than 3,000 of whom are international. We have nine diverse schools, covering every facet of engineering from software to space, and from chemical to civil engineering.

Our remit and vision is broad, yet we also have seven key areas in which we direct even more effort to excel: energy, health, water, digital services, infrastructure, manufacturing services, and natural resources.

We maintain strong links with the business community, keeping our teaching fresh and relevant, and ensuring students are assisted through industry and Faculty scholarship programs. Our graduates are in high demand, with extremely competitive graduating salaries.

As well as the extensive facilities available at our Kensington campus, we also have a range of other research facilities, including the Water Research Laboratory at Manly Vale and heavy materials testing equipment at Randwick.



OUR STRENGTHS

- More than 60 years of sustained excellence in cutting-edge research and education
- World-class research facilities and equipment
- Degrees that are highly flexible and transferable
- Practical, industry-relevant courses, with links and opportunities to work with businesses
- Extensive scholarship program
- Largest, most diverse engineering faculty in Australia
- World-leading centres of excellence and international collaboration on research
- Graduates are highly sought after internationally and receive the highest salaries in the GO8
- Broad range of engineering degrees, across nine diverse schools
- Relatively high and growing proportion of female engineering students
- Mindset of entrepreneurialism, with dedicated staff and facilities to mentor, support and bring about the commercialisation of ideas
- Internationally respected, with researchers regularly winning global awards and funding



VOLKSWAGEN

AKTIENGESELLSCHAFT

The Volkswagen Group is one of the world's leading automobile manufacturers and the largest carmaker in Europe. The Group comprises twelve brands from seven European countries. The product spectrum ranges from motorcycles to low-consumption small cars and luxury vehicles. In the commercial vehicle sector, the products include ranges from pick-ups, buses and heavy trucks. The Group's goal is to offer attractive, safe and environmentally sound vehicles which can compete in an increasingly tough market and set world standards in their respective class.

Baxter

Baxter International Inc. (NYSE:BAX), through its subsidiaries, develops, manufactures and markets products that save and sustain the lives of people with hemophilia, immune disorders, infectious diseases, kidney disease, trauma, and other chronic and acute medical conditions. As a global, diversified healthcare company, Baxter applies a unique combination of expertise in medical devices, pharmaceuticals and biotechnology to create products that advance patient care worldwide.



**Trade &
Investment**

NSW Trade & Investment is the lead economic development agency in New South Wales, responsible for driving sustainable economic growth across the state. We work with local, national and international customers and strive for a strong customer service focus in all areas of service delivery. We achieve results by collaborating with and supporting businesses, industries and communities to advance investment, trade, innovation, productivity and regional growth across all sectors.

Welcome Reception

Sponsored by Volkswagen

Date: Tuesday 7 April
Time: 17:30 – 18:30
Location: Scientia Foyer
Dress: Smart casual

A selection of Canapés and beverages will be served.



Morning Tea

Time: 10:00 – 10:30
Every day
Location: Scientia Main Foyer

A selection of beverages and biscuits will be served

Lunch

Time: 12:30 – 13:00
Every day
Location: Scientia Main Foyer

A selection of hot and cold dishes along with dessert and beverages will be served.

Afternoon Tea

Time: 15:30 – 16:00
Every day
Location: Scientia Main Foyer

A selection of beverages and biscuits will be served.

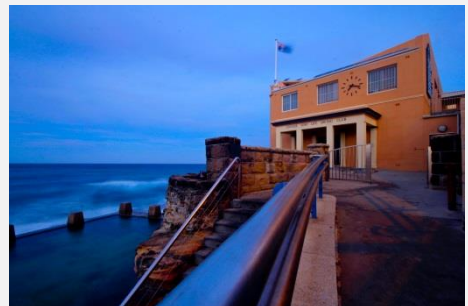
Conference Dinner

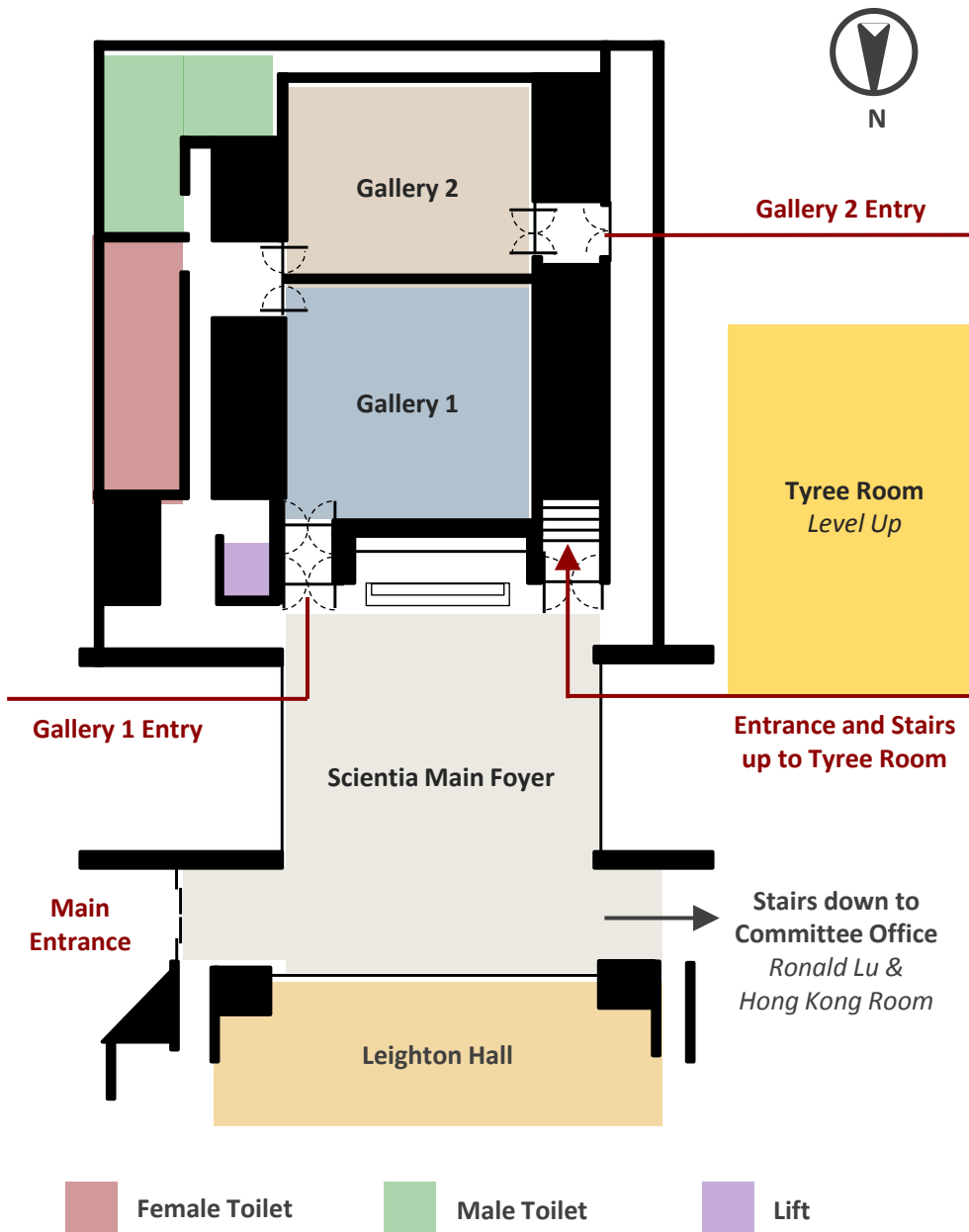
Date: Wednesday 8 April
Time: 19:00 – 23:00
Location: Jack 'Pud' Cannot Ocean Room, Coogee Surf Life Saving Club
Dress: Smart casual

Inspired by the recent G20 summit, an Australian style BBQ along with dessert and beverages will be served to provide a truly Aussie experience.

Addr.: Cnr Beach and Carr St. Coogee

- 30 mins walk from UNSW
- Shuttle bus service will be provided from UNSW to Coogee





Program Overview

	Tuesday 7 April	Wednesday 8 April	Thursday 9 April
0900-1000	Plenary Session		
0900-0930	Welcome Address	Keynote 2: Dr S. Krinke	Keynote 4: Prof. S. Skerlos
0930-1000	Keynote 1: Prof. M. Hauschild	Keynote 3: Dr B. Kornfeld	Keynote 5: Prof. C. Herrmann
1000 – 1030	Morning Tea		
1030 – 1230	S1 - Energy and Resource Efficiency: a Manufacturing System View (1)	S10 - Energy and Resource Efficiency: a Manufacturing System View (2)	S19 - Energy and Resource Efficiency: a Process View (1)
	S2 - LCA & LCC: Methodology	S11 - LCA & LCC: Case Studies (3)	S20 - Sustainability in Product-Service Systems
	S3 - End of Life: Recycling	S12 - End of Life: Waste Management	S21 - End of Life Strategies
1230 – 1330	Lunch		
1330 – 1530	S4 - Energy Efficient Production Planning (1)	S13 - Energy and Resource Efficiency: a Manufacturing System View (3)	S22 - Energy and Resource Efficiency: a Process View (2)
	S5 - LCA & LCC: Case Studies (1)	S14 - LCA & LCC: Case Studies (4)	S23 - Technical Solutions with Life Cycle Thinking
	S6 - End of Life: Remanufacturing (1)	S15 - End of Life: Disassembly	S24 - Energy and Resource Efficiency of Cutting Fluid Strategies
1530 – 1600	Afternoon Tea		
1600 – 1720	S7 - Energy Efficient Production Planning (2)	S16 - Energy and Resource Efficiency: a Manufacturing System View (4)	S25 - Energy and Resource Efficiency: a Process View (3)
	S8 - LCA & LCC: Case Studies (2)	S17 - Eco-design	S26 - Sustainability in Education and Research
	S9 - End of Life: Remanufacturing (2)	S18 - Sustainability in Supply Chain	S27 - Sustainability Assessment
Evening	Welcome Reception	Conference Dinner	



Tyree Room	Plenary Session 1
0900 - 0930	Opening & Welcome Address
0930 – 1000	Keynote 1: Prof. Michael Z. Hauschild Better - but good enough? On the need to consider both eco-efficiency and eco-effectiveness to gauge industrial sustainability

Tyree Room	S1 - Energy and Resource Efficiency: a Manufacturing System View (1)
1030 - 1050	Green factory supported by advanced carbon-based manufacturing <i>Dominik Rohrmus, Volkmar Dörich, Nils Weinert</i>
1050 – 1110	Investigating the energy consumption of the PECM process for consideration in the selection of manufacturing process chains <i>Martin Swat, Andreas Rebschläger, Kirsten Trapp, Tim Stock, Günther Seliger, Dirk Bähre</i>
1110 - 1130	Method for increasing energy efficiency in flexible manufacturing systems in machining process - A case study <i>Hugo M. B. de Carvalho, Jefferson de Oliveira Gomes</i>
1130 - 1150	Approach for implementing a control and optimization loop for an energy-efficient factory <i>Sylvia Wahren, Jörg Siegert, Thomas Bauernhansl</i>
1150 – 1210	Assessing combined water-energy-efficiency measures in the automotive industry <i>Ina Schlei-Peters, Denis Kurl, Matthias Gerhard Wichmann, Sebastian Thiede, Christoph Herrmann, Thomas Stefan Spengler</i>
1210 - 1230	An investigation into minimising total energy consumption and total completion time in a flexible job shop for recycling carbon fiber reinforced polymer <i>Ying Liu, Ashutosh Tiwari</i>

Gallery 1	S2 - LCA & LCC: Methodology
1030 - 1050	Expanding the scope of LCA to include 'Societal Value': A framework and methodology for assessing positive product impacts <i>Kei L.F. Shin, James A. Colwill, Robert I. Young</i>
1050 – 1110	Leveraging life cycle assessment to evaluate environmental impacts of green cleaning products <i>Kathryn G. Van Lieshout, Cindy Bayley, Sarah O. Akinlabi, Lisa von Rabenau, David Dornfeld</i>
1110 - 1130	Towards more holistic environmental impact assessment: Hybridisation of life cycle assessment and quantitative risk assessment <i>Yumi Kobayashi, Greg M. Peters, Stuart J. Khan</i>
1130 - 1150	Cradle to cradle: Effective vision vs. efficient practice? <i>Marten Ewo Toxopeus, Bjorn de Koeijer, Albert Meij</i>

Continued on the next page

Gallery 1	S2 - LCA & LCC: Methodology
1150 – 1210	Analysis of potential relationships between functional analysis and life cycle assessment <i>Paulina Rodriguez Moreno, Serge Rohmer, Hwong-Wen Ma</i>
1210 - 1230	Data-intensive Life Cycle Assessment (DILCA) for deteriorating products <i>Raunak Bhinge, Amrita Srinivasan, Stefanie Robinson, David Dornfeld</i>

Gallery 2	S3 - End of Life: Recycling
1030 - 1050	Design and implementation of an end-of-life vehicle recycling center based on IoT (Internet of Things) in Korea <i>Hwa-Cho Yi, Jung Whan Park</i>
1050 – 1110	System of decision-making assistance for the recycling of manufactured products <i>Khalifa Gaye, Amadou Coulibaly, Mickael Gardoni</i>
1110 - 1130	Recycling of CFRP for high value applications: Effect of sizing removal and environmental analysis of the SuperCritical Fluid Solvolysis <i>Michel Dauguet, Olivier Mantaux, Nicolas Perry, Yaoyao Fiona Zhao</i>
1130 - 1150	Scenarios for the return of lithium-ion batteries out of electric cars for recycling <i>Nirugaa Natkunarajah, Matthias Scharf, Peter Scharf</i>
1150 – 1210	Utilisation of reconfigurable recycling systems for improved value recovery from e-waste <i>Michael J. Barwood, Ji Lie, Tegan Pringle, Shahin Rahimifard</i>
1210 - 1230	Opportunities to improve recycling of automotive lithium ion batteries <i>Alexandru Sonoc, Jack Jeswiet, Vi Kie Soo</i>

Tyree Room	S4 - Energy Efficient Production Planning (1)
1330 - 1350	Energy-orientated machine scheduling for hybrid flow shops <i>Fabian Keller, Christina Schönborn, Gunther Reinhart</i>
1350 – 1410	Analysis of energy oriented switching controlled production lines <i>Nicla Frigerio, Andrea Matta</i>
1410 - 1430	"E Benchmark - a pioneering method for energy efficient process planning and assessment along the life cycle process" <i>Sven Kreitlein, Sabrina Schwender, Tobias Rackow, Joerg Franke</i>
1430 - 1450	Evaluation of demand response actions in production logistics <i>Günther Schuh, Ulrich Brandenburg, Yuan Liu</i>
1450 – 1510	Method for designing an energy-agile energy system for industrial manufacturing <i>Timm Kuhlmann, Thomas Bauernhansl</i>
1510 - 1530	An energy-cost-aware scheduling methodology for sustainable manufacturing <i>Xu Gong, Toon De Pessemer, Wout Joseph, Luc Martens</i>



Gallery 1	S5 - LCA & LCC: Case Studies (1)
1330 - 1350	Life cycle environmental impact evaluation of newly manufactured diesel engine and remanufactured LNG engine <i>Junli Shi, Tao Li, Zhichao Liu, Hongchao Zhang, Shitong Peng, Qihong Jiang, Jinsong Yin</i>
1350 – 1410	Framework to predict the environmental impact of additive manufacturing in the life cycle of a commercial vehicle <i>Mathias Burkhart, Jan C. Aurich</i>
1410 - 1430	Life cycle assessment of one-way and pooled pallet alternatives <i>Jonas Bengtsson, James Logie</i>
1430 - 1450	Life cycle assessment of electric vehicles - a framework to consider influencing factors <i>Patricia Egede, Tina Dettmer, Christoph Herrmann, Sami Kara</i>
1450 – 1510	Interaction between new car design and recycling impact on life cycle assessment <i>Vi Kie Soo, Paul Compston, Matthew Doolan</i>
1510 - 1530	Life cycle assessment and comparison of CRT, LCD and LED Monitors <i>Vikrant Bhakar, Aashray Agur, A. K. Digalwar, Kuldip Singh Sangwan</i>

Gallery 2	S6 - End of Life: Remanufacturing (1)
1330 - 1350	A study of fatigue remaining useful life assessment for construction machinery part in remanufacturing <i>Yaozhong Wu, Weijia Li, Ping Yang</i>
1350 – 1410	Remanufacturing decision based on RUL assessment <i>Yawei Hu, Shujie Liu, Hongchao Zhang</i>
1410 - 1430	Exploring new horizons for remanufacturing: An up-to-date overview of industries, products and technologies <i>Rolf Steinhilper, Fernand Weiland</i>
1430 - 1450	The impact of automotive product remanufacturing on environmental performance <i>Shanshan Yang, Hoong Yeap Ngiam, Soh Khim Ong, Andrew Yeh Ching Nee</i>
1450 – 1510	Towards facilitating circular product life-cycle information flow via remanufacturing <i>Jelena Kurilova-Palisaitiene, Louise Lindkvist and Erik Sundin</i>
1510 - 1530	WRCloud: a novel WEEE remanufacturing cloud system <i>Xi Vincent Wang, Lihui Wang</i>

Tyree Room	S7 - Energy Efficient Production Planning (2)
1600 - 1620	Increasing collaboration productivity for sustainable production systems <i>Günther Schuh, Christina Reuter, Annika Hauptvogel</i>
1620 – 1640	An approach for energy-oriented production control using energy flexibility <i>Cedric Schultz, Peter Sellmaier, Gunther Reinhart</i>
1640 - 1700	Simulation-based approach for eco-optimized production control systems <i>Christian Brecher, Simon Müller, Marc Kujas, Wolfram Lohse</i>
1700 - 1720	Making sustainability paradigms a part of PPC <i>Matthias Putz, Johannes Stoldt, Christin Fanghänel, Annett Bierer, Andreas Schlegel</i>
Gallery 1	S8 - LCA & LCC: Case Studies (2)
1600 - 1620	Goal-oriented life cycle investigations for composite manufacturing chains <i>Florian Lindner, Robert Schmitt</i>
1620 – 1640	Life cycle assessment of a mini hydro power plant in Indonesia: A case study in Karai river <i>Jessica Hanafi, Anthony Riman</i>
1640 - 1700	Social life cycle assessment of three Brazilian furniture companies <i>Carlos Alberto Shuch Bork, Durval João De Barba Junior, Jefferson de Oliveira Gomes</i>
1700 - 1720	Development of the methodology for environmental impact of composite boats manufacturing process <i>Yong-Kuk Jeong, Philippe Lee, SeungHoon Nam, Dong Kun Lee, Jong-Gye Shin</i>
Gallery 2	S9 - End of Life: Remanufacturing (2)
1600 - 1620	Remanufacturing of electronic control units: An RFID based (service) interface <i>Joachim Kleylein-Feuerstein, Fabian Joas, Rolf Steinhilper</i>
1620 – 1640	Remanufacturing-oriented geometric modelling for the damaged region of components <i>Yingzhong Zhang, Zhenyan Yang, Guangzhi He, Yun Qin, Hong-chao Zhang</i>
1640 - 1700	Influence of powders and process parameters on bonding shear strength and micro hardness in laser cladding remanufacturing <i>Mingsan Xu, Jianfeng Li, Jibin Jiang, Bingbing Li</i>
1700 - 1720	Simplified life cycle assessment and analysis of remanufacturing cleaning technologies <i>Shitong Peng, Tao Li, Junli Shi, Hongchao Zhang</i>
1730 – 1830	Welcome Reception, Scientia Main Foyer



Tyree Room	Plenary Session 2
0900 - 0930	Keynote 2: Dr Stephan Krinke Life Cycle Engineering: The Roadmap to Emission Free Mobility
0930 – 1000	Keynote 3: Dr Bernard J. Kornfeld Industry-university collaboration in sustainable manufacturing
Tyree Room	S10 - Energy and Resource Efficiency: a Manufacturing System View (2)
1030 - 1050	Automatic variant configuration and generation of simulation models for comparison of plant and machinery variants <i>Adrian Neyrinck, Armin Lechler, Alexander Verl</i>
1050 – 1110	KPI-focused simulation and management system for eco-efficient design of energy intensive production systems <i>Günther Riexinger, Philipp Holtewert, Axel Bruns, Sylvia Wahren, Khoi Tran, Thomas Bauernhansl</i>
1110 - 1130	3D thermal climate monitoring in factory buildings <i>G. Gerrit Posselt, Paul Booij, Sebastian Thiede, Jeroen Fransman, Bart Driessen, Christoph Herrmann</i>
1130 - 1150	Assessing the impact of embodied water in manufacturing systems <i>Smaeil Mousavi, Sami Kara, Bernard Kornfeld</i>
1150 – 1210	Simulation based assessment of lean and green strategies in manufacturing systems <i>Sebastian Greinacher, Emanuel Moser, Hanjo Hermann, Gisela Lanza</i>
1210 - 1230	Hierarchical modelling of complex material and energy flow in manufacturing systems <i>Samira Alvandi, Georg Bienert, Wen Li, Sami Kara</i>
Gallery 1	S11 - LCA & LCC: Case Studies (3)
1030 - 1050	Carbon footprint of cassava starch production in northeastern Thailand <i>Phairat Usubharatanaa, Harnpon Phunggrassamia</i>
1050 – 1110	Environmental impact analysis of a water supply system: study of an Indian university campus <i>Vikrant Bhakar, Nitesh Sihag, Rebekka Gieschen, Stefan Andrew, Christoph Herrmann, Kuldip Singh Sangwan</i>
1110 - 1130	From LCC to LCA using a hybrid input output model - a maritime case study <i>Louise Laumann Kjær, Aris Pagoropoulos, Michael Hauschild, Morten Birkved, et al.</i>
1130 - 1150	Integrated carbon metrics and assessment for the built environment <i>Soo Huey Teh, Thomas Wiedmann, Judith Schinabeck, Hazel Rowley, Stephen Moore</i>
1150 – 1210	Material flow cost accounting extended to the supply chain - challenges, benefits and links to life cycle engineering <i>Martina Prox</i>
1210 - 1230	KPI and LCA evaluation of integrated microwave technology for high temperature processes <i>Corina Dorn, Ralph Behrend, Dimitrios Giannopoulos, Loredana Napolano, Beatriz García Baños, Valentina James, Volker Uhlig, José M Catalá, et al.</i>

Gallery 2	S12 - End of Life: Waste Management
1030 - 1050	Resource efficiency and composite waste in UK supply chain <i>Norshah Aizat Shuaib, Paul Tarisai Mativenga, James Kazie, Stella Job</i>
1050 – 1110	Towards a circular economy for end-of-life vehicles: A comparative study UK - Japan <i>Mélanie Despeisse, Yusuke Kishita, Masaru Nakano, Michael Barwood</i>
1110 - 1130	Optimization of a non-hazardous integrated solid waste processing line <i>Camille Jourdain, Peggy Zwolinski</i>
1130 - 1150	Modeling the value recovery of rare earth permanent magnets at end-of-life <i>Liang Cong, Hongyue Jin, Pete Fitsos, Timothy McIntyre, Yuehwern Yih, Fu Zhao, John W. Sutherland</i>
1150 – 1210	Use of post-consumer scrap in aluminium wrought alloy structural components for the transportation sector <i>Kristian Martinsen, Sverre Gulbrandsen-Dahl</i>
1210 - 1230	Assessment framework and material flow analysis of material recovery facilities within the U.S. to track consumer electronics by product category <i>Jennifer Mangold, Kathy Cristobal, Carole Mars, David Dornfeld</i>

Tyree Room	S13 - Energy and Resource Efficiency: a Manufacturing System View (3)
1330 - 1350	The need for better energy monitoring within industry <i>Kristine O’Rielly, Jack Jeswiet</i>
1350 – 1410	Energy efficiency evaluation for machining process in flexible manufacturing systems in machining process - A case study <i>Hugo M. B. de Carvalho, Jefferson de Oliveira Gomes</i>
1410 - 1430	Availability-based payback method for energy efficiency measures <i>Robert Kasprowicz, Carolin Schulz</i>
1430 - 1450	Knowledge based and PLM facilities for sustainability perspective in manufacturing: a global approach <i>Farouk Belkadi, Alain Bernard, Florent Laroche</i>
1450 – 1510	On the applicability of sustainability assessment in manufacturing <i>Anastasiia Moldavska, Torgeir Welo</i>
1510 - 1530	Energy efficiency benchmarking method for mass and high-mix low-volume productions <i>Yee Shee Tan, Tobias Bestari Tjandra, Bin Song</i>



Gallery 1	S14 - LCA & LCC: Case Studies (4)
1330 - 1350	Quantifying the life cycle water consumption of a machine tool <i>Jahau Lewis Chen, Yen-Bou Chen, Hua-Chih Huang</i>
1350 – 1410	Assessing the environmental performance of machine tools - Case studies applying the 'LCA to go' Webtool <i>Florian Krautzer, Rainer Pamminger, Carl Diver, Wolfgang Wimmer.</i>
1410 - 1430	Application of Life Cycle Assessment (LCA) and Design of Experiments (DOE) to the monitoring and control of a grinding process <i>Diogo A. L. Silva, Remo A. P. Filleti, André L. Christoforo, Eraldo J. Silva, et al.</i>
1430 - 1450	Environmental comparison of metal coating processes <i>Karel Kellens, Dimos Paraskevas, Wim Dewulf, Joost R. Dufloy</i>
1450 – 1510	Metrics-based sustainability evaluation of cryogenic machining <i>Tao Lu, I.S. Jawahir</i>
1510 - 1530	Tool state assessment for reduction of life cycle environmental impacts of aluminium machining processes via infrared temperature monitoring <i>Alessandro Simeone, Elliot Woolley, Shahin Rahimifard</i>
Gallery 2	S15 - End of Life: Disassembly
1330 - 1350	Two stage sequence generation for partial disassembly of products with sequence dependent task times <i>Robert J. Riggs, Xiaoning Jin, S. Jack Hu</i>
1350 – 1410	Economic and environmental evaluation of fasteners for active disassembly: A case study for payment terminals <i>Jef R. Peeters, Paul Vanegas, Wim Dewulf, Joost R. Dufloy</i>
1410 - 1430	Proposal of a design method for dismantling products with split-lines <i>Yumi Shiraishi, Naoya Miyaji, Shinichi Fukushige, Yasushi Umeda</i>
1430 - 1450	Robot assisted disassembly for the recycling of electric vehicle batteries <i>Kathrin Wegener, Wei Hua Chen, Franz Dietrich, Klaus Dröder, Sami Kara</i>
1450 – 1510	Impact of multi-material components on the assembly and disassembly of traction batteries <i>Alexander Tornow, Stefan Andrew, Franz Dietrich, Klaus Dröder</i>
1510 - 1530	Improvement of optimal disassembly sequences of complex systems family using Petri Nets <i>Serigne Diagne, Amadou Coulibaly, Mbaye Sene</i>
1900 - 2300	Conference Dinner, Coogee Surf Life Saving Club

Tyree Room	S16 - Energy and Resource Efficiency: a Manufacturing System View (4)
1600 - 1620	A sustainability indicator framework for Singapore small and medium-sized manufacturing enterprises <i>Hui Xian Tan, Zhiquan Yeo, Ruisheng Ng, Tobias Bestari Tjandra, Bin Song</i>
1620 – 1640	Decentralised energy futures: the changing emissions reduction landscape <i>Benjamin McLellan, Nick Florin, Damien Giurco, Yusuke Kishita, Kenshi Itaoka, Tetsuo Tezuka</i>
1640 - 1700	Energy use in premanufacture (mining) <i>Jack Jeswiet, James Archibald, Ursula Thorley, E. De Souza</i>
1700 - 1720	A big data analytics approach to develop industrial symbioses in large cities <i>Song Bin, Yeo Zhiquan, Low Sze Choong Jonathan, Derek Koh Jiewei, Denis Kurle, Felipe Cerdas, Christoph Herrmann</i>
Gallery 1	S17 - Eco-design
1600 - 1620	Accounting the impacts of waste product in package design <i>Tim Grant, Victor Barichello, Leanne Fitzpatrick</i>
1620 – 1640	Evolving product information in aligning product development decisions across disciplines <i>Ellen Oude Luttikhuis, Jos de Lange, Eric Lutters, Roland ten Klooster</i>
1640 - 1700	Design and manufacturing of a sustainable pedelec <i>Tom Buchert, Jón Garðar Steingrímsson, Sabrina Neugebauer, The Duy Nguyen, Mila Galeitzke, Nicole Oertwig, Johannes Seidel, Randy McFarland, et al.</i>
1700 - 1720	Module based renewal planning of energy using products for reducing environmental load and life cycle cost <i>Hiroki Iijima, Saya Yoshida, Shozo Takata</i>
Gallery 2	S18 - Sustainability in Supply Chain
1600 – 1620	Sustainability in the supply chain through synchronization of demand and supply in ETO-companies <i>Patrick Dallasega, Erwin Rauch, Dominik T. Matt</i>
1620 – 1640	Coordination of a manufacturer and supply chain partners for product line design with consideration of remanufactured products <i>Ridvan Aydin, C.K. Kwong, Ping Ji</i>
1640 - 1700	A system to increase the sustainability and traceability of supply chains <i>Michele Germani, Marco Mandolini, Marco Marconi, Eugenia Marilungo, Alessandra Papetti</i>
1700 - 1720	A green and economic future of inland waterway shipping <i>Wilfried Sihm, Heimo Pascher, Karl Ott, Sandra Stein, Andreas Schumacher, Giuseppe Mascolo</i>



Tyree Room	Plenary Session 3
0900 - 0930	Keynote 4: Prof. Steven J. Skerlos Promoting effectiveness in sustainable design
0930 – 1000	Keynote 5: Prof. Christoph Herrmann The Positive Impact Factory - Transition from Eco-Efficiency to Eco-Effectiveness
Tyree Room	S19 - Energy and Resource Efficiency: a Process View (1)
1030 - 1050	An energy analysis of electric and pneumatic ultra-high speed machine tool spindles <i>Paul Harris, Barbara Linke, Stephen Spence</i>
1050 – 1110	Vibration analysis and energy efficiency in interrupted face milling process <i>Hugo M. B. de Carvalho, Jefferson de Oliveira Gomes, Marco Antonio Schmidt, Vitor L.C. Brandão</i>
1110 - 1130	Holistic simulation environment for energy consumption prediction of machine tools <i>Eberhard Abele, Steffen Braun, Philipp Schraml</i>
1130 - 1150	Quantifying green manufacturability of a unit production process using simulation <i>Amandeep Singh, Deepu Philip, J. Ramkumar</i>
1150 – 1210	Characterising energy efficiency of electrical discharge machining (EDM) processes <i>Wen Li, Sami Kara</i>
1210 - 1230	Technical performance and energy intensity of the electrode-separator composite manufacturing process <i>Jan Schmitt, Gerrit Posselt, Franz Dietrich, Sebastian Thiede, Annika Raatz, Christoph Herrmann, Klaus Dröder</i>
Gallery 1	S20 - Sustainability in Product-Service Systems
1030 - 1050	Data-oriented technical complaint management for sustainable problem solution <i>Alexander Linder, Robert Schmitt</i>
1050 – 1110	A study on optimum circulation period of products for minimizing lifecycle energy consumption <i>Yuji Mizuno, Naoya Kintoki, Yusuke Kishita, Shinichi Fukushige, Yasushi Umeda</i>
1110 - 1130	Target-oriented modularization - Addressing sustainability design goals in product modularization <i>Friedrich A. Halstenberg, Tom Buchert, Jérémy Bonvoisin, Kai Lindow, Rainer Stark</i>
1130 - 1150	Growing near net shape components from renewable materials <i>Manuel Löwer, Anna-Lena Beger, Iliyas Raza, Jörg Feldhusen, Alexandra Wormit, Jürgen Prell, Björn Usadel, Thomas-Benjamin Seiler, Christoph Kämpfer, et al.</i>
1150 – 1210	Immaterial elements as drivers of sustainability in products and services <i>Julio Cesar Rivera P., Bernabé Hernandis O., Sheila Cordeiro M., Omar Miranda O.</i>

Continued on the next page

Gallery 1	S20 - Sustainability in Product-Service Systems
1210 - 1230	Maintenance decisions of part agent based on failure probability of a part using Bayesian estimation <i>Keisuke Nanjo, Yuki Yamamori, Yumihito Yokoki, Yuta Sakamoto, Hiroyuki Hiraoka</i>
Gallery 2	S21 - End of Life Strategies
1030 - 1050	Defining circulation factories - A pathway towards Factories of the Future <i>Felipe Cerdas, Denis Kurle, Stefan Andrew, Sebastian Thiede, Christoph Herrmann, Yeo Zhiquan, Low Sze Choong Jonathan, Song Bin, Sami Kara</i>
1050 - 1110	Prerequisites for a high-level framework to design sustainable plants in the e-waste supply chain <i>Ilaria Barletta, Björn Johansson, Johanna Reimers, Johan Stahre, Cecilia Berlin</i>
1110 - 1130	Conceptualizing ReX for aggregating end-of-life strategies in product development <i>Siru Sihvonen, Tuomas Ritola</i>
1130 - 1150	Proposal of a closed loop framework for the improvement of industrial systems' life cycle performance: Experiences from the linked design project <i>Daniele Cerri, Marco Taisch, Sergio Terzi, Andrea Buda, Kary Framling, Soumaya El Kaddiri, Ana Milicic, Dimitris Kiritsis, Simone Parrotta, Eric Peukert</i>
1150 - 1210	Machine-based dismantling of end of life vehicles: A life cycle perspective <i>Ezzat El Halabi, Mike Third, Matthew Doolan</i>
1210 - 1230	Network design and optimization for multi-product, multi-time, multi-echelon closed-loop supply chain under uncertainty <i>Anil Jindal, Kuldip Singh Sangwan, Sachin Saxena</i>
Tyree Room	S22 - Energy and Resource Efficiency: a Process View (2)
1330 - 1350	Customer integration to gain cost efficiency alongside tool's life cycle <i>Günther Schuh, Martin Pitsch, Thomas Kühn</i>
1350 - 1410	Addressing sustainability and flexibility in manufacturing via smart modular machine tool frames to support sustainable value creation <i>Bernd Peukert, Stephan Benecke, Janire Clavell, Sabrina Neugebauer, Nils F. Nissen, Eckart Uhlmann, Klaus-Dieter Lang, Matthias Finkbeiner</i>
1410 - 1430	How services influence the energy efficiency of machine tools: A case study of a machine tool manufacturer <i>Gülsüm Mert, Sebastian Waltemode, Jan C. Aurich</i>
1430 - 1450	Life cycle oriented milling tool management in small scale productions <i>Dominik Heeschen, Fritz Klocke, Kristian Arntz</i>

Continued on the next page



Tyree Room	S22 - Energy and Resource Efficiency: a Process View (2)
1450 – 1510	Data collection for energy monitoring purposes and energy control of production machines <i>Eberhard Abele, Niklas Panten, Benjamin Menz</i>
1510 – 1530	Optimization of machining parameters to minimize surface roughness using integrated ANN-GA approach <i>Kuldip Singh Sangwan, Sachin Saxena, Girish Kant</i>
Gallery 1	S23 - Technical Solutions with Life Cycle Thinking
1330 - 1350	Minimization of the energy consumption in motion planning for multi-robot tasks <i>Stefania Pellegrinelli, Stefano Borgia, Nicola Pedrocchi, Enrico Villagrossi, Giacomo Bianchi, Lorenzo Molinari Tosatti</i>
1350 – 1410	Resource efficiency optimization of manufacturing processes using evolutionary computation <i>Frank Kübler, Johannes Böhner, Rolf Steinhilper</i>
1410 - 1430	Supercritical CO2 cleaning of carbonaceous deposits on diesel engine valve <i>Weiwei Liu, Xiaochuan Qing, Mingzheng Li, Lihong Liu, Hongchao Zhang</i>
1430 - 1450	Reducing the development life cycle of automotive valves and seat valves using a new workbench for high temperature wear testing <i>Luis Alberto Breda Mascarenhas, Jefferson de Oliveira Gomes, Andrey Teixeira Portela, Cristiano Vasconcellos Ferreira</i>
1450 – 1510	Efficiency and environmental analysis of a systems for renewable electricity generation and electrochemical storage of residential buildings <i>Michele Germani, Daniele Landi, Marta Rossi</i>
1510 - 1530	A cost and resource consumption model for improving resource-efficiency of configurable roll-to-roll processing <i>Yeo Zhiquan, Ng Ruisheng, Song Bin</i>
Gallery 2	S24 - Energy and Resource Efficiency of Cutting Fluid Strategies
1330 - 1350	Cutting fluid drag-out and exhaust air in grinding processes: Influence on the eco-efficiency <i>Nadine Madanchi, Marius Winter, Christoph Herrmann</i>
1350 – 1410	Adaptive and adequate lubrication for highest component-lifetimes in feed drive axes with ball screws <i>Jürgen Fleischer, Andreas Spohrer, Urs Leberle, Steffen Dosch</i>
1410 - 1430	Effectiveness of minimizing cutting fluid use when turning difficult-to-cut alloys <i>Paolo C. Priarone, Matteo Robiglio, Luca Settineri, Vincenzo Tebaldo</i>
1430 - 1450	Methodology of process oriented dimensioning of cooling lubricant pressure and volume flow for increasing resource efficiency <i>Benjamin Döbbeler, Fritz Klocke, Dieter Lung</i>
Continued on the next page	

Gallery 2	S24 - Energy and Resource Efficiency of Cutting Fluid Strategies
1450 – 1510	Investigation into alternative cooling methods for achieving environmentally friendly machining process <i>Yogie Rinaldy Ginting, Brian Boswell, Wahidul Biswas, Nazrul Islam</i>
1510 - 1530	Energy efficient process chain: The impact of cutting fluid strategies <i>Nadine Madanchi, Denis Kurle, Marius Winter, Sebastian Thiede, Christoph Herrmann</i>
Tyree Room	S25 - Energy and Resource Efficiency: a Process View (3)
1600 - 1620	Reduced commissioning time of components in machine tools through electronic data transmission <i>Steffen Dosch, Andreas Spohrer, Jürgen Fleischer</i>
1620 – 1640	Analysis of tool utilization from material removal rate perspective <i>A. E. Bonilla Hernández, Tomas Beno, Jari Repo, Anders Wretland</i>
1640 - 1700	Innovative high-performance ceramics - Challenge for the life cycle engineering of turbomachinery <i>Eckart Uhlmann, Martin Bilz, Jeannette Baumgarten, Tiago Borsoi Klein</i>
Gallery 1	S26 - Sustainability in Education and Research
1600 - 1620	Effective integration of life cycle engineering in education <i>Ellen Oude Luttikhuis, Marten Toxopeus, Eric Lutters</i>
1620 – 1640	SimGreen: a serious game to learn how to improve environmental integration into companies <i>Feng Zhang Peggy Zwolinski</i>
1640 - 1700	Enablers and barriers of sustainable manufacturing: Results from a survey of researchers and industry professionals <i>Neeraj Bhanot, P. Venkateswara Rao, S.G. Deshmukh</i>
Gallery 2	S27 - Sustainability Assessment
1600 - 1620	The conceptualization of sustainability in operations management <i>David Opresnik, Marco Taisch</i>
1620 – 1640	Sustainability assessment in conventional and industrialized systems built in Brazil <i>Durval João De Barba Junior, Jefferson de Oliveira Gomes, Juliana Ferreira Santos Bastos de Lacerda</i>
1640 - 1700	Sustainability in manufacturing through distributed manufacturing systems (DMS) <i>Erwin Rauch, Matthias Dallinger, Patrick Dallasega, Dominik T. Matt</i>
1700 - 1720	Sustainable manufacturing: IPPMD reference model applied to the design of reconfigurable manufacturing systems <i>Jhonattan Miranda, Dante Chavarría, Miguel Ramírez-Cadena, Arturo Molina</i>



	Tuesday 7 April	Wednesday 8 April	Thursday 9 April
1030 – 1230 Concurrent Sessions	S1 - Energy and Resource Efficiency: a Manufacturing System View (1) <i>Prof. H. Bley</i>	S10 - Energy and Resource Efficiency: a Manufacturing System View (2) <i>Prof. A. Matta</i>	S19 - Energy and Resource Efficiency: a Process View (1) <i>Prof. J. Sutherland</i>
	S2 - LCA & LCC: Methodology <i>Prof. M. Z. Hauschild</i>	S11 - LCA & LCC: Case Studies (3) <i>Prof. W. Sihm</i>	S20 - Sustainability in Product-Service Systems <i>Prof. T. S. Spengler</i>
	S3 - End of Life: Recycling <i>Prof. H. Kaebnick</i>	S12 - End of Life: Waste Management <i>Prof. S. J. Hu</i>	S21 - End of Life Strategies <i>Prof. K. S. Sangwan</i>
	S4 - Energy Efficient Production Planning (1) <i>Prof. I. Jawahir</i>	S13 - Energy and Resource Efficiency: a Manufacturing System View (3) <i>Prof. K. Martinsen</i>	S22 - Energy and Resource Efficiency: a Process View (2) <i>Prof. Ö. S. Ganiyusufoglu</i>
1330 – 1530 Concurrent Sessions	S5 - LCA & LCC: Case Studies (1) <i>Prof. P. Zwolinski</i>	S14 - LCA & LCC: Case Studies (4) <i>Dr B. Song</i>	S23 - Technical Solutions with Life Cycle Thinking <i>Prof. J. Jeswiet</i>
	S6 - End of Life: Remanufacturing (1) <i>Prof. S. Takata</i>	S15 - End of Life: Disassembly <i>Prof. A. Raatz</i>	S24 - Energy and Resource Efficiency of Cutting Fluid Strategies <i>Prof. S. Skerlos</i>
	S7 - Energy Efficient Production Planning (2) <i>Prof. L. Wang</i>	S16 - Energy and Resource Efficiency: a Manufacturing System View (4) <i>Dr S. Krinke</i>	S25 - Energy and Resource Efficiency: a Process View (3) <i>Dr S. Thiede</i>
1600 – 1720 Concurrent Sessions	S8 - LCA & LCC: Case Studies (2) <i>Prof. H. Kaebnick</i>	S17 - Eco-design <i>Prof. Y. Umeda</i>	S26 - Sustainability in Education and Research <i>Prof. C. Herrmann</i>
	S9 - End of Life: Remanufacturing (2) <i>Prof. R. Steinhilper</i>	S18 - Sustainability in Supply Chain <i>Dr B. Kornfeld</i>	S27 - Sustainability Assessment <i>Prof. W. Dewulf</i>

Mobile App LCE 2015

Our organising committee has developed a mobile application for our conference, which provides information and functions to assist you during the conference. It is free to download by scanning either of the following QR codes:

Apple IOS



Android



Contact

The 22nd CIRP Conference on Life Cycle Engineering Sydney 2015

Web: <http://www.lceresearch.unsw.edu.au/lce2015>

Email: LCE2015@unsw.edu.au

Sustainable Manufacturing and Life Cycle Engineering Research Group

School of Mechanical and Manufacturing Engineering

The University of New South Wales

Web: <http://www.lceresearch.unsw.edu.au>

Conference Chairman

Professor Sami Kara

Email: S.Kara@unsw.edu.au

Tel: +61-2-9385-5757

Fax: +61-2-9663-1222

Arinex

Address: Level 10, 51 Druiitt Street, Sydney 2000

Email: lce2015@arinex.com.au

Tel: +61-2-9265-0700

Fax: +61-2-9267-5443

**The 22nd CIRP Conference
On Life Cycle Engineering**





22nd CIRP LCE
Sydney 2015

Organised by



Sustainable Manufacturing and Life Cycle Engineering Research Group
School of Mechanical and Manufacturing Engineering
The University of New South Wales, Sydney
www.lceresearch.unsw.edu.au
www.sustainable-manufacturing.com



Arinex Pty Ltd
Accommodation • Conference Management • Corporate & Special Events
• Registration Destination Management • Marketing • Sponsorship &
Exhibitions • Technology
Website: www.arinex.com.au

Main Sponsors

VOLKSWAGEN

AKTIENGESELLSCHAFT

Baxter

Supported by



UNSW
AUSTRALIA

Engineering



Trade &
Investment