

# International Conference on Advanced Design Research and Education (ICADRE14)

---

16 – 18 July 2014  
National University of Singapore

---

## PROGRAMME & ABSTRACTS

---

Organised by



Supported by



*Published by*

**Organising Committee**

International Conference on Advanced Design Research and Education (ICADRE14)

Copyright © 2014 ICADRE 2014 Organising Committee.  
All rights reserved.

Personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution to servers or lists, or to reuse any copyrighted component of this work in other works must be obtained from the Publisher.



*Design & Typeset by* Research Publishing Services, Singapore.  
E-mail: [enquiries@rpsonline.com.sg](mailto:enquiries@rpsonline.com.sg)

# Table of Contents

Preface	iv
<b>Committees</b>	
<i>Conference Committee</i>	v
<i>Programme Chairs</i>	v
<i>Scientific Committee</i>	vi
Keynote Speakers	vii
General Information	xii
<b>Programme</b>	
<i>Day 1 — Wednesday, 16 July 2014</i>	xiv
<i>Day 2 — Thursday, 17 July 2014</i>	xv
<i>Day 3 — Friday, 18 July 2014</i>	xvi
Abstracts	1
Programme-At-A-Glance	End

## Preface

The conference committee sincerely welcomes all delegates to the International Conference on Advanced Design Research and Education 2014 (ICADRE14). Design is an integral part of engineering. Therefore, it is important for students to be prepared well for a career in engineering design. However, this objective is difficult to achieve in practice. How should we impart engineering design skills to university students? This is especially challenging as new engineering design theories and methods are constantly proposed by practitioners and academia from around the globe. There is hence a need to consolidate emerging ideas in design research in order to enhance the process of training engineering students.

ICADRE is organised to bring together academics that have specific interest in the study, promotion, and development of design education in a tertiary education setting. The main objectives of the conference are to advance research in design and to discuss how the output of design research can be applied to design education. We are glad that we have the opportunity to host the conference at the National University of Singapore, and in conjunction with the Annual Meeting of the Association for Engineering Education in Southeast Asia, East Asia and the Pacific (AEESEAP). AEESEAP was founded in 1970 by UNESCO and the World Federation of Engineering Organizations (WFEO) to improve the education of engineers and technologists in its member countries. Current AEESEAP member countries are Australia, Brunei Darussalam, PR of China, Fiji, Indonesia, Japan, Korea, Lao PDR, Malaysia, New Zealand, Papua New Guinea, Philippines, Singapore, Thailand and Vietnam. We hope that ICADRE delegates and AEESEAP country representatives will be able to leverage on this opportunity to foster dialogues and exchange ideas to improve engineering education. Lastly, the conference committee would like to thank all who have contributed to make this event a success and we wish you a fruitful conference and a pleasant stay in Singapore.

**Edwin Koh  
Victor Shim  
Tan Woei Wan  
Ian Gibson  
Andi S. Putra**

## Conference Committee

### Chair

Edwin KOH  
*National University of Singapore*

### Secretary

Iris NG  
*National University of Singapore*

### Treasurer

LIM Hui Leng  
*National University of Singapore*

### Programme Chairs

Victor SHIM  
*National University of Singapore*

TAN Woei Wan  
*National University of Singapore*

Ian GIBSON  
*Deakin University*

Andi S. PUTRA  
*National University of Singapore*

## Scientific committee

Deon de Beer  
*Vaal University of Technology*

Nicholas Caldwell  
*University Campus Suffolk*

Michel A. Cardin  
*National University of Singapore*

Kah Hin Chai  
*National University of Singapore*

Amaresh Chakrabarti  
*Indian Institute of Science*

Yong Hua Chen  
*University of Hong Kong*

Gi Heung Choi  
*Hansung University*

Nathan Crilly  
*Cambridge University*

Steve Culley  
*Bath University*

Mark DeLessio  
*New York University*

Olaf Diegel  
*Massey University*

Claudia Eckert  
*Open University*

Hajime Fujita  
*Nihon University*

Yoichi Kemmochi  
*Japanese Society for Engineering Education*

Takashi Komeda  
*Shibaura Institute of Technology*

Matthias Kreimeyer  
*MAN Truck & Bus AG*

Yongfeng Li  
*Hill-Rom*

Guy Littlefair  
*Deakin University*

Anja Maier  
*Technical University of Denmark*

Catharina Nawangpalupi  
*Parahyangan University*

Katja Holtta Otto  
*Singapore University of Technology and Design*

Kevin Otto  
*Singapore University of Technology and Design*

Panos Papalambros  
*University of Michigan*

Ming Po Tham  
*National University of Singapore*

Kristin Wood  
*Singapore University of Technology and Design*

# Keynote Speakers

## Keynote 1

### Training Future Engineers: What Can We Learn from Twelve Outstanding Innovators?

**Prof. Amaresh Chakrabarti**

*Indian Institute of Science (IISc), Bangalore*

## Biography

**Amaresh Chakrabarti** is a professor of Engineering Design at the Centre for Product Design and Manufacturing, Indian Institute of Science (IISc), Bangalore. He has BE in Mechanical Engineering from Univ. of Calcutta (now BESU), India, ME in Mechanical Design from IISc, and PhD in Engineering Design from University of Cambridge, UK. After PhD, he led for ten years the Design Synthesis team at the EPSRC Centre for Excellence Engineering Design Centre at University of Cambridge, before joining IISc as an Associate Professor. His interests are in design synthesis and creativity, biomimetics, eco-design and sustainability, product informatics, virtual reality, and design research methodology. He authored/edited 10 books, over 230 peer-reviewed articles, and has 6 patents granted/pending. He co-authored DRM, a methodology used widely as a framework for doing engineering design research. He is an Associate Editor, AI EDAM (CUP), Area Editor, Research in Engg Design (Springer), Regional Editor, J of Remanufacturing (Springer), and Advisory Editor for 7 International Journals incl. J of Engg Design (T&F), Clean Technologies and Environmental Policy (Springer), and Int J of Design Creativity and Innovation (T&F). Professor Chakrabarti has been elected twice to the Advisory Board of Design Society, UK, where he is currently a member of its Board of Management. He is a member of the CII National Committee on Design, India, member of the Jury for India Design Mark and India Design Excellence Awards of India Design Council. He founded IDeASLab – the first laboratory in India for research into design creativity, sustainability and innovation. He is Programme chair for International Conferences on Research into Design (ICoRD) and 22nd CIRP Design Conference (CIRP Design 2012), Conference Chair for 3rd International Conference on Design Creativity (ICDC 2015) and vice-Chair for AI in Design (AID) and Design Computing and Cognition (DCC) Conferences. He is an Honorary Fellow of the Institution of Engineering Designers, the peer society under the UK Royal Charter in engineering design. Seven of his papers won top paper awards in various international conferences.

## Abstract

A design is a plan for a system, its implementation and utilisation for attaining goals that are intended to change “current situations into preferred ones”. Designing involves developing both the goals and the plans for attaining them. In this sense, all human beings are designers. but not all are necessarily good at designing. A study was undertaken, into the lives and work of 12 outstanding engineers and innovators that spanned from antiquity to the modern times, to seek common, major influences on the success of these individuals. A major, persistent thread across these lives was found to be design-driven motivation that fuelled their life-long creativity and learning. The talk focuses on the relevance of this influence as well as the other influences as goals and enablers for creating the engineers of the future: how can we inculcate strong motivation in life-long learning? The talk will provide an overview of a Masters in design programme that has been running successfully at the Indian Institute of Science, Bangalore for the last 15 years. Based on the personal experience of the speaker in teaching at this programme, as well as his experience of teaching and researching into engineering science and design at the Engineering Department of University of Cambridge, UK, a number of recommendations are made on the desired structure and content for a design and innovation-centred engineering education programme.

International Conference on Advanced Design Research and Education (ICADRE14)

16 – 18 July 2014 ❖ National University of Singapore

*Keynote Speakers***Keynote 2****The Importance and Universality of the Design Process****Prof. Steve Culley***Bath University***Biography**

**Professor Steve Culley** is Head of Design and Manufacturing, having worked in the Steel, Fluid power and Rubber Industries. He researches in the engineering design field, this has focussed on the provision of information and knowledge to support engineering designers. He is Visiting Erskine Fellow at the University of Canterbury, New Zealand. Professor Culley is also a member of the EPSRC College of Peers and former member of their Strategic Advisory Team (SAT) for Engineering. He is Chair for IMechE, Manufacturing Industries Divisional Board and was Programme Chair for International Conference of Engineering Design (ICED11), Copenhagen. Professor Culley is also Associate Editor Journal of Engineering Design (JED) and a reviewer for the Royal Academy of Finland for their TUKEVA and now their KITARA programme in Design and Manufacturing and IT.

**Abstract**

This keynote address will have two aspects to it, the first is to discuss and show the way that businesses use and interpret the classical engineering design process models that are described and developed in books, standards and the academic literature. What will be shown is the underlying importance of these models and the way that none of them are an exact match, they all have elements, interpreted for their own particular domain. The second part is to show how an understanding of the key elements, of what after all is a complex process, can be developed in a continuum of activities in an undergraduate Master of Engineering course. This is through a combined lecture and integrated design studio programme. It is particularly this latter programme that has to be thought about and developed carefully to build up in complexity and scope to cover the key elements of the overall design process.



**Keynote 3****Challenging Disciplines: Cross-Course Projects to Do Engineering****Prof. Kevin Otto***Singapore University of Technology and Design***Biography**

**Kevin Otto** is an Associate Professor at the Singapore University of Technology and Design. His expertise lies in innovation, robust design, robotics, smart buildings, and future technology market planning. Prof. Otto has consulted extensively on a wide variety of complex system design, such as aircraft air management systems, low-energy building systems and medical devices. Generally, he provides expertise on innovation, helping companies project the future value stream and competitive landscape, as well as change scenarios, the impact of radical new technologies, stakeholder decision modeling, adoption forecasting, and technology roadmaps. He also provides expertise to radically improve development processes by leverage modeling and analysis, modularity, portfolio planning, requirements, and robustness and reliability. Improvements of 2 to 10 times on delivery and quality are typical. Prof. Otto is a Fellow of the ASME, on the Design Society Board, and has received numerous awards including the R&D 100 Award for one of the 100 most innovative products. He is author of "Product Design," a book that presents the tools and techniques needed to execute and institute an innovative design culture: voice of the customer, benchmarking, architecture, modeling, statistics, and experimentation are all covered from a design-engineering viewpoint. He has also written many peer-reviewed academic journal articles.

**Abstract**

Problems faced by engineers today are characterized by ever more complex multidisciplinary issues. Yet, it is often difficult to demonstrate multidisciplinary engineering problems in the undergraduate curriculum, particularly in the early Freshman and Sophomore years, since the students have not enrolled in a breadth of subjects. Multidisciplinary topics are reserved to latter years, and so students are unclear how course subjects relate to one another and fit together in engineering design as a whole. This keynote will discuss new approaches to integrate multiple course materials early in the Freshman and Sophomore years. This includes approaches such as multiple concurrent courses simultaneously attacking a common design problem. For example, one approach taken was for one dedicated week, concurrent courses stopping coursework and instead simultaneously worked on a challenge problem engaging the subject matter of the courses. Another approach is for this to be worked on in staggered courses term to term, where the challenge problem is engaged in parts each term. We found the cross-disciplinary challenge problem approach generated highly effective learning on the multidisciplinary nature of design problems, including statistically significant impact on student perceptions of their ability to solve multidisciplinary design problems. As an example, courses in biology, thermodynamics, differential equations, and software with controls were merged in a design challenge problem of developing a perishable food delivery system composed of unrefrigerated unmanned ground vehicles. Experiences and outcomes of such early multidisciplinary challenge problems will be explored.

*Keynote Speakers***Keynote 4****Quality Learning and Teaching and Assessment Strategies in Engineering Design: An Australian Perspective on Meeting Accreditation Requirements****Prof. Lyn Brodie***Southern Queensland University***Biography**

**Lyn Brodie** is an Associate Professor and Associate Dean (Students) in the Faculty of Health, Engineering and Science at the University of Southern Queensland. Her research interests include engineering education, Problem Based Learning, assessment, curriculum design and the first year experience. She is a board and founding member of the USQ Teaching Academy and Director of the Engineering Education Research Group. Lyn was the academic team leader for the teaching team which successfully designed a strand of PBL courses for the faculty. Her work has been recognised through several awards including a University Award for Design and Delivery of Teaching Materials, Carrick Institute Citation and Australian University Teaching Award for Innovation in Curricula Learning and Teaching, USQ Associate Learning and Teaching Fellowships for curriculum and assessment development and recognition from the Australian Association of Engineering Educators for innovation in curricula. On several occasions Lyn has been a visiting Professor to the University of Hong Kong – Centre for Advancement of University Teaching, consulting in both PBL and online curriculum development and assessment. She is the current president for the Australasian Association for Engineering Education (AAEE).

**Abstract**

National and international accreditation standards and practices are critical to maintaining high quality graduates to meet an increasingly diverse range of engineering tasks. Graduates now are expected to be able to work in a globalised economy and to have their qualifications accepted internationally. A key foundation in this recognition is maintaining quality learning, teaching and assessment strategies. Design plays an important role in engineering education but are universities and the engineering curriculum sufficiently supporting and developing this skill? In Australia the declining manufacturing industry, especially in the automotive sector, will have consequences for design education. In addition the increasing focus on 'research' for universities has implications for using the vast skill set and knowledge of practicing engineers, those with relevant industry experience, in teaching undergraduates. So the question we are now faced with is — is the accreditation practice and processes sufficient to guide universities to deliver high quality graduates skilled in design?

**Keynote 5****How Design Modules help in the Accreditation of Engineering Programmes\*****Prof. Tan Teng Hooi***Engineering Accreditation Board, IES***Biography**

**Dr. Tan Teng Hooi** is a Board member of the Engineering Accreditation Board, Institution of Engineers Singapore (IES). He started his career in Ove Arup & Partners in 1980 and joined the School of Civil and Environmental Engineering at NTU in 1985 as a Lecturer and eventually an Associate Professor. He also served as the Vice-Dean (Administration) of the school. From 2008 to 2012, he was a Senior Principal and the Chief Operating Officer at T.Y. Lin International Pte Ltd. Prof. Tan is a Chartered Engineer and Professional Engineer, a Fellow of the Institution of Civil Engineers (UK) and the Institution of Engineers Singapore (IES). He is also a member of the Disciplinary Panel in the Council for Estate Agencies and the Inquiry Panel for the Law Society. Prof Tan is presently the Head of the Building and Project Management Programme, School of Science and Technology, SIM University. In addition to providing short courses and consultancy services to the industry, he has served in many technical committees on standards in SPRING Singapore relating to the construction industry; he is currently a member of SPRING, Singapore's Technical Committee on Building Structure and Sub-structure wherein he is also the Convenor, on the adoption of Eurocode\_0 and Eurocode\_1 in Singapore and a workgroup member for Eurocode\_2. He is also a member of the Building and Construction Authority (BCA) Assessment Committees for the Design & Engineering Safety Excellence Awards and the Built Environment Leadership Awards. He was a Council member in IES (2004-2008), a Board member in the Professional Engineers Board Singapore (2009-2011) and a Council member in the Association of Consulting Engineers (2012).

**Abstract**

Multi-lateral agreements e.g. The Washington Accord have been created to allow mutual recognition of engineering qualifications between groups of jurisdictional agencies responsible for accreditation or recognition of tertiary-level engineering qualifications within their jurisdictions. The activity of design is fundamental to engineering and it permeates every aspect of the profession. This presentation outlines the importance of design modules in engineering education and how they are evaluated in its accreditation by EAB. The presentation also briefly covers the International Engineering Alliance's guidance document on graduate attributes and professional competencies which will be adopted by all signatories so as to provide a better and more uniform understanding and expectation of the desired outcomes.

\*This paper is co-authored by See Ho ONG, Engineering Accreditation Board, IES, Singapore.

## General Information

### Conference Dates & Venue

16 to 18 July 2014  
National University of Singapore  
Engineering Auditorium  
9 Engineering Drive 1  
Singapore 117576  
(Please see Map)

### Registration and Collection of Conference Package

Registration and collection of conference package will commence from 08:30 onwards at the Engineering Auditorium Foyer.

*Please wear your name badge at all times for identification.*

### Conference Dinner

17 July 2014  
17:50–19:00

All conference delegates, including student delegates are invited for the dinner.

Dinner served will be halal.

### Instructions for Oral Presentation

1. The time scheduled for the following presentations are as follows:
  - Keynote : 60 mins
  - Invited : 30 min
  - Regular : 20 mins
2. 5 mins before the end of each presentation, a bell will be sounded to remind you to wrap up your presentation within the next minute and to allow a couple of minutes for Q& A.
3. Presentation should be done using MS Office PowerPoint. A laptop with a projector will be available in all sessions. All presenters should save their presentation in a USB storage device in a format that can be read by PowerPoint 2007 on a Windows-based PC.
4. Presenters should transfer their files to the provided laptop in the venue of their presentation as early as possible. Preferable times are during coffee and lunch breaks. A conference assistant will be available to assist the presenters.
5. Presenters are requested to submit a short Speaker's CV to the student volunteer when transferring their files (the Speaker's CV form is available with the student volunteer).

[illegible]

# Day 1 — Wednesday, 16 July 2014

0830-0900	Registration
0900-0915	Opening Address Prof Chua Kee Chaing Dean, Faculty of Engineering, National University of Singapore
0915-0930	ICADRE14 – At a glance Edwin Koh Conference Chair
0930-1030	Keynote Training Future Engineers: What Can We Learn from Twelve Outstanding Innovators? Prof Amaresh Chakrabarti Indian Institute of Science (IISc), Bangalore
1030-1100	Morning Tea
1100-1130	Invited Taxonomy of Procedures and Design Framework to Enable Flexibility in Engineering Systems Michel-Alexandre Cardin National University of Singapore
1130-1200	Invited What Do Coupling Modularity Metrics Measure? Katja Hölttä-Otto Singapore University of Technology and Design (SUTD)
1200-1220	Towards Complexity Cost Management within Approaches for Developing Modular Product Families Sebastian Ripperda and Dieter Krause Hamburg University of Technology (TUHH)
1220-1240	Identification of Key Parameters for Adaptable Design David Moya Carreras <sup>a</sup> , Cristina Carro Saavedra <sup>a</sup> , Phillip Schrieverhoff <sup>a</sup> , Sebastian Haupt <sup>b</sup> and Udo Lindemann <sup>a</sup> <sup>a</sup> Technische Universität München (TUM), <sup>b</sup> MAG IAS GmbH
1240-1300	Valuation of Adaptability in Carbon Fibre Placement Systems Phillip Schrieverhoff <sup>a</sup> , Sebastian Haupt <sup>b</sup> , Andreas Goessl <sup>b</sup> , Cristina Carro Saavedra <sup>a</sup> and Udo Lindemann <sup>a</sup> <sup>a</sup> Technische Universität München (TUM), <sup>b</sup> MAG IAS GmbH
1300-1400	Lunch
1400-1500	Keynote The Importance and Universality of the Design Process Prof Steve Culley Bath University
1500-1530	Invited The Future of Engineering Design Education – An Australasian Perspective and Solution Guy Littlefair and Alex Stojcevski Deakin University
1530-1550	Design and Implementation of Engineering Design Thinking and Design Practice Modules Wan Chin Tan, Yee Siong Liang, Peter, Pheow Hwa Lek Nggee Ann Polytechnic
1550-1610	Afternoon Tea
1610-1630	Sendai School of Design: Project Driven Design Education Based on a Wide Range of Highly Adaptive Collaboration Masashige MOTOE Tohoku University
1630-1650	Systems Engineering Design Education based on Multidisciplinary and Global Project Based Learning Masahiro Inoue <sup>a</sup> , Hirosih Hasegawa <sup>a</sup> , Kazunori Mano <sup>a</sup> , Yoshimi Furukawa <sup>a</sup> Atsuko Yamazaki <sup>a</sup> , Khantachawana Aank <sup>b</sup> , and Masahiko Tachibana <sup>b</sup> <sup>a</sup> Shibaura Institute of Technology, <sup>b</sup> King Mongkut's University of Technology Thonburi
1650-1710	Implementation of Concrete to Abstract Teaching in an Engineering Design Module Andi Sudjana Putra <sup>a</sup> and Yongfeng Li <sup>b</sup> <sup>a</sup> Engineering Design and Innovation Centre (EDIC), <sup>b</sup> Hill-Rom Services Pte Ltd
1710-1730	Two Lessons from a Short-Duration Design-Build-Test Activity Devon K. Boyd and Matthew B. Parkinson Penn State University
1730-1750	Impact of Engineering Change in Design Education Joerg D. Weigl and Edwin C.Y. Koh National University of Singapore

International Conference on Advanced Design Research and Education (ICADRE14)

16 – 18 July 2014 ❖ National University of Singapore

## Day 2 — Thursday, 17 July 2014

0900-1000	Keynote Challenging Disciplines: Cross-Course Projects to Do Engineering Prof Kevin Otto Singapore University of Technology and Design
1000-1030	Invited Talk from Industry 3D Printing paving way for Future Engineers Sean Looi Creatz3D
1030-1100	Morning Tea
1100-1130	Invited Design Methodologies and Tools for Planning? Mark P. De Lessio NYU Polytechnic School of Engineering
1130-1150	The Impact of Activities during Fuzzy Front End on NPD Project Success: A Comparative Study between Korean and Japanese Manufacturers Ruslan Mammetseyidov and Akio Nagahira Tohoku University
1150-1210	A Knowledge-based Approach to Optimize Simulations in the Product Development Process Cristina Carro Saavedra, Phillip Schrieverhoff and Udo Lindemann Technische Universität München (TUM)
1210-1230	Intellectual Capital Performance Indicators for Complex Project Management Mario Štorga and Stanko Škec University of Zagreb
1230-1250	A Categorization and Visualization Scheme to determine Engineering Change Effects in Companies Martina Carolina Wickel, Stefan Langer, Nepomuk Chucholowski and Udo Lindemann Technische Universität München (TUM)
1250-1400	Lunch
1400-1410	Welcome Address for AESEAP Annual Meeting Prof Chua Kee Chaing Dean, Faculty of Engineering, National University of Singapore
1410-1440	AESEAP Distinguished Lecture The Vision for the Next Decade for the Engineering Education in Asia Prof Takashi Komeda President, AESEAP
1440-1510	AESEAP Distinguished Lecture Changes of Future Society and Engineering Education: Required Capacities and Strategies Prof Kim Moon Kyum President-elect, AESEAP
1510-1610	Keynote Quality Learning and Teaching and Assessment Strategies in Engineering Design: An Australian Perspective on Meeting Accreditation Requirements Prof Lyn Brodie Southern Queensland University
1610-1630	Afternoon Tea
1630-1650	Human-Computer Interaction for Part Selection in Product Design Naoaki Saeki <sup>a</sup> and Panos Y. Papalambros <sup>b</sup> <sup>a</sup> Nagoya University, <sup>b</sup> University of Michigan
1650-1710	Consumer Preference Analysis on Flute Attributes in Indonesia using Conjoint Analysis Yogi Tri Prasetyo, Amalia Suzianti <sup>b</sup> and Ayesha Parvati Dewi Universitas Indonesia
1710-1730	User-Centered Design for Research: Following Our Own Recommendations Constantin von Saucken and Udo Lindemann Technische Universität München (TUM)
1730-1750	Design for Sustainable Empowerment with Robust System James A.K. Tan Ngee Ann Polytechnic
1750-1810	The Need for and Lessons from a Web-based Tool for Design for Human Variability D. Reuben Haupt, Christopher J. Garneau, Matthew B. Parkinson Penn State University
1830-1900	Dinner



## Day 3 — Friday, 18 July 2014

0900-1000	Keynote How Design Modules help in the Accreditation of Engineering Programmes Prof Tan Teng Hooi Engineering Accreditation Board, IES
1000-1030	Invited Talk from Industry Future of How Things are Designed and Made Prabakar Murugappan Autodesk
1030-1100	Morning Tea
1100-1130	Invited World Design Cities Ricardo Sosa and Kris L. Wood Singapore University of Technology and Design
1130-1140	Creativity Awareness in Engineering Schools in Asia Ricardo Sosa and Poon King Wang Singapore University of Technology and Design
1140-1200	Ill-defined Engineering Problem Solving Empirical Study Yanliuxing Yan <sup>a</sup> , Pingfei Jiang <sup>a</sup> , Amanda Squires <sup>b</sup> and Peter R N Childs <sup>a</sup> <sup>a</sup> Imperial College London, <sup>b</sup> Royal Albert Hall
1200-1220	Open Innovation: Motivation of External Open Innovation Partners Maik Holle <sup>a</sup> , Michael N. du Maire <sup>b</sup> and Udo Lindemann <sup>a</sup> <sup>a</sup> Technische Universität München (TUM), <sup>b</sup> Heinrich-Geißler-Str. 12
1220-1240	An Overview of Design Cognition between Experts and Novices James Tan Jun Yuan, Kuan Yoke Kong, Hashina Parveen, Huang Zhixiang, Ganeshkumar Rajasekaran, Jitendra Kumar Behera, Roozbeh Sanaei, Kevin N. Otto, Katja Hölttä-Otto Singapore University of Technology and Design
1240-1250	Closing Remarks
1250-1350	Lunch