

21st International Conference on Engineering Design (ICED17)

Vancouver, Canada
21-25 August 2017

Volume 1 of 9

Editors:

Anja Maier
Harrison Kim
Josef Oehmen
Filippo Salustri

Stanko Skec
Michael Kokkolaras
Georges Fadel
Mike Van der Loos

ISBN: 978-1-5108-5396-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by The Design Society
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact The Design Society
at the address below.

Design Society Administration
24 Dark Lane
Backwell
Bristol BS48 3NS
United Kingdom

Phone: +44 (0) 1275 851579

admin@designsociety.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Volume 1: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Resource-Sensitive Design | Design Research Applications and Case Studies

Resource-Sensitive Design

Challenges and preconditions to build capabilities for sustainable product design.....	1-1
<i>Schulte, Jesko; Hallstedt, Sophie</i>	
A tool for assessing customers' barriers for consuming remanufactured products.....	1-11
<i>Almfelt, Lars; Rexfert, Oskar</i>	
Design for resource-limited societies: Informational behaviour of designers.....	1-21
<i>Jagtap, Santosh; Larsson, Andreas; Warell, Anders</i>	
Design for complex product rebirth or how to protect resources.....	1-31
<i>Masle, Christian</i>	
Helping inhabitants in energy saving and getting inputs from usage for eco-design: Cooking case study	1-41
<i>Abi Akle, Audrey; Lizarralde, Iban</i>	
A process for designing lean- and sustainable production.....	1-51
<i>Jaghbeer, Yasmeen; Motyka, Yvonne; Hallstedt, Sophie</i>	
Mindfulness and resource-sensitive design: A literature overview and an agenda for research.....	1-61
<i>Chan, Wing Mui Helen; de Bont, Cees</i>	
Mixed-flow irrigation pump design optimization for Bangladesh.....	1-71
<i>Yu, Su; Colton, Jonathan S.</i>	
Hybrid top-down and bottom-up framework to measure products' circularity performance	1-81
<i>Saidani, Michael; Yannou, Bernard; Leroy, Yann; Cluzel, François</i>	
Passive monitoring in the workplace: Design guidelines for self quantified employee feedback system	1-91
<i>Tufail, Muhammad; Lee, Haebin; Kim, Myungjin; Kim, KwanMyung</i>	
Using TheDesignExchange as a knowledge platform for human-centered design-driven global development.....	1-101
<i>Kramer, Julia; Poreh, Danielle; Agogino, Alice</i>	
Is this system eco-innovative? A case-based workshop	1-111
<i>Vallet, Flore; Tyl, Benjamin; Pialot, Olivier; Millet, Dominique</i>	
Methodology for multiple life cycles product ecodesign.....	1-121
<i>Troussier, Nadege; Sirina, Natalia; Adragna, Pierre-Antoine; Amaya, Jorge; Reyes, Tatiana</i>	
Technical planning tasks and participants involved in planning Adaptive Buildings	1-131
<i>Honold, Clemens; Binz, Hansgeorg; Roth, Daniel</i>	
An eco-innovation method for products in Bottom of the Pyramid (BoP).....	1-141
<i>Chen, Jahau Lewis; Chung, Shih-Hou</i>	
Using local invasive species and flora to manufacture collagen based biodegradable plastic tableware	1-151
<i>Willett, Kathryn; Howell, Bryan</i>	
Overdesign in building services: the hidden energy use	1-159
<i>Jones, Darren; Eckert, Claudia</i>	
Telepathic product design for water conservation	1-169
<i>Ramaswamy, Naren; MacDonald, Erin</i>	

TABLE OF CONTENTS

Building a business case for ecodesign implementation: A system dynamics approach	1-179
<i>Rodrigues, Vinícius; Pigosso, Daniela; McAlone, Tim</i>	
Teaching systemic design for sustainability in engineering by building eco skis.....	1-189
<i>Luthe, Tobias; Lumpe, Thomas; Schwarz, Jonas; Schütz, Martin; Shea, Kristina</i>	
Environmental impacts during the product usage - Identification and categorisation of influencing factors.....	1-199
<i>Kattwinkel, Daniela; Herzog, Michael; Neumann, Marc; Bender, Beate</i>	
Is product design evil?	1-209
<i>Coutts, Euan Ross; Edward, Jack; Knight, Richard; Duffy, Alex; Grierson, Hilary</i>	
Design for micro-enterprise: a field study of user preference behavior	1-219
<i>Austin-Breneman, Jesse; Yang, Maria</i>	
Economic development as design: Insight and guidance through the PSI framework.....	1-229
<i>Subrahmanian, Eswaran; Eckert, Claudia; McMahon, Christopher; Reich, Yoram</i>	
An exploratory study to integrate feasibility into the eco-design process: An approach to link design and environmental parameters	1-239
<i>Bratec, Florian; Matta, Nada; Reyes, Tatiana; Troussier, Nadège; Diaz Pichardo, René; Voinot, Thibaut; Jouanne, Guillaume</i>	
Improving needs-finding techniques for medical device development at low resource environments using Activity Theory	1-249
<i>Rismani, Shalaleh; Van der Loos, H. F. Machiel</i>	
Co-design in Zambia - an examination of design outcomes.....	1-259
<i>Brubaker, Eric Reynolds; Jensen, Carl; Silungwe, Sunday; Sheppard, Sheri D.; Yang, Maria</i>	

TABLE OF CONTENTS

Design Research Applications and Case Studies

Selective pre-load generation: Finding manufacturing-integrated solutions for linear guides.....	1-269
<i>Roos, Michael; Wagner, Christian; Gramlich, Sebastian; Reichwein, Jannik; Kirchner, Eckhard</i>	
Experimental and simulative assessment of crashworthiness of mechanically aged short-fibre reinforced thermoplastics.....	1-279
<i>Witzgall, Christian; Wartzack, Sandro</i>	
A semi-formal approach to structure and access knowledge for multi-material-design.....	1-289
<i>Kleemann, Sebastian; Inkermann, David; Bader, Benjamin; Türck, Eiko; Vietor, Thomas</i>	
Generic approach to plausibility checks for structural mechanics with deep learning	1-299
<i>Spruegel, Tobias; Schröppel, Tina; Wartzack, Sandro</i>	
A qualitative study to identify the need and requirements on further development of design guidelines for fibre-reinforced composites	1-309
<i>Butenko, Viktoriia; Wilwer, Jürgen; Spadinger, Markus; Albers, Albert</i>	
Value-driven engineering design: Lessons learned from the road construction equipment industry.....	1-319
<i>Bertoni, Marco; Panarotto, Massimo; Jonsson, Pontus</i>	
Fiber-reinforced composite design within a lightweight and material-oriented development process	1-329
<i>Kaspar, Jerome; Vielhaber, Michael</i>	
The frame network of interdisciplinary stakeholder compositions in the early phases of new product development	1-339
<i>Andersen, Alexander Kjær; Nafei, Nadiim; Planck, Michael; Nielsen, Louise Møller</i>	
A design case study: Transferring design processes and prototyping principles into industry for rapid response and user impact	1-349
<i>Sng, Karen Hui En; Raviselvam, Sujithra; Anderson, David; Blessing, Lucienne; Camburn, Bradley Adam; Wood, Kristin</i>	
Improving inclusive design practice - transferring knowledge from sports design practice.....	1-359
<i>Wilson, Nicky; Thomson, Avril; Riches, Philip</i>	
Digital representation of product functions in multicopter design	1-369
<i>Ramsaier, Manuel; Holder, Kevin; Zech, Andreas; Stetter, Ralf; Rudolph, Stephan; Till, Markus</i>	
A decade trend of utilization of design tools and methods in Japanese product industries.....	1-379
<i>Nomaguchi, Yutaka; Takami, Masashi; Sakaguchi, Anna; Fujita, Kikuo</i>	
A concept and prototype for a new app to support collaborative and multi- criteria decision making in product development.....	1-389
<i>Luft, Thomas; Rupprecht, Simon; Wartzack, Sandro</i>	
Pattern recognition for the integration of mechanical simulations in product development workflows	1-399
<i>Schweigert, Sebastian; Schöner, Martin; Lindemann, Udo</i>	
Multi-criteria analysis of multi-material lightweight components on a conceptual level of detail	1-409
<i>Fröhlich, Tim; Kleemann, Sebastian; Türck, Eiko; Vietor, Thomas</i>	
Holistic approach for design and re-design of production units.....	1-419
<i>Stäbler, Markus; Weber, Jakob; Paetzold, Kristin; Vielhaber, Michael</i>	
Application of product development process (PDP) in the construction of vertical axis wind turbine with movable blades.....	1-429
<i>Santiago, George; Hernandez, Willmari; Costa de Araujo, Ana Cláudia; Rosa, Marcela; González, Mario</i>	

Material selection - A qualitative case study of five design consultancies.....	1-439
<i>Asbjorn Sorensen, Charlotte; Warell, Anders; Jagtap, Santosh</i>	
Development of a tongue machine interface for quadriplegic patients.....	1-449
<i>Velásquez-López, Alejandro; Velásquez-Rendón, David; Amaya-Quiroz, Juan Sebastian; Jimenez-Franco, Luis David; Trefftz, Helmuth</i>	
Measuring frugality - application to a solar water distiller.....	1-459
<i>Rohmer, Serge; Merabtine, Abdelatif; Bouzidi, Youcef</i>	
Foot plantar pressure offloading: How to select the right material for a custom made insole.....	1-469
<i>Mandolini, Marco; Brunzini, Agnese; Manieri, Steve; Germani, Michele</i>	
Biofidelic design of the forearm of a myoelectric prosthesis with maximum functional volume	1-479
<i>Ramananarivo, Mathieu; Raison, Maxime; Barron, Olivier; Achiche, Sofiane</i>	
Graph-based similarity analysis of BOM data to identify unnecessary inner product variance.....	1-489
<i>Schmidt, Michael; Gehring, Benedikt; Gerber, Jan-Sebastian; Stocker, Johannes Michael; Kreimeyer, Matthias; Lienkamp, Markus</i>	
Design of human-powered hybrid electric-power shovel for deep excavation	1-499
<i>Matsuura, Naoki; Hatano, Yuji; Iizuka, Teppei; Fujisawa, Tatsuro; Wesugi, Shigeru</i>	
Reverse natures: Design synthesis of Texture-Based Metamaterials (TBMs).....	1-509
<i>Patel, Sayjal Vijay; Mignone, Paul John; Tam, Mark Kam-Ming; Rosen, David</i>	
Engineering of assembly systems using graph-based design languages	1-519
<i>Breckle, Theresa; Kiefer, Jens; Rudolph, Stephan; Manns, Martin</i>	
A concept of an integrated system for monitoring changes on the human skin.....	1-529
<i>Zezelj, Dragan; Bojcetic, Nenad; Pletikapic Exle, Latica</i>	
On the design of Len Lye's Flaming Harmonic.....	1-539
<i>McGregor, Angus; Gooch, Shayne; Webb, Evan</i>	

TABLE OF CONTENTS

Volume 2: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Design Processes | Design Organisation and Management

Design Processes

A tool to support project time evaluation	2-1
<i>Bojetic, Nenad; Zezelj, Dragan; Salopek, Damir; Valjak, Filip</i>	
Using data- and network science to reveal iterations and phase-transitions in the design process	2-11
<i>Piccolo, Sebastiano; Lehmann, Sune; Maier, Anja</i>	
An exploratory study into the impact of new digital design and manufacturing tools on the design process	2-21
<i>Corsini, Lucia; Moultrie, James</i>	
A guide to investigating design process models context of use	2-31
<i>Costa, Daniel Guzzo; Costa, Janaina; Rozenfeld, Henrique</i>	
A comparison of design decisions made early and late in development	2-41
<i>Tan, James; Otto, Kevin; Wood, Kristin</i>	
Eliciting configuration design heuristics with hidden Markov models.....	2-51
<i>McComb, Christopher; Cagan, Jonathan; Kotovsky, Kenneth</i>	
Using clustering algorithms to identify subproblems in design processes.....	2-61
<i>Morency, Michael; Anparasan, Azrah; Herrmann, Jeffrey; Gralla, Erica</i>	
Introducing constraints to enhance integration at the design-manufacturing interface of new product development	2-71
<i>Bix, Susanne</i>	
Context-specific process design: An integrated process lifecycle model and situations for context factor use	2-81
<i>Hollauer, Christoph; Wilberg, Julian; Omer, Mayada; Lindemann, Udo</i>	
Modelling the design parameters dynamics with Petri nets.....	2-91
<i>Juranic, Jasmin; Pavkovic, Never; Naumann, Thomas; Marjanovic, Dorian</i>	
A computational approach to expose conversation dynamics in engineering design activities.....	2-101
<i>Wulvik, Andreas; Menning, Axel; Steinert, Martin</i>	
Current state of practices in open source product development.....	2-111
<i>Bonvoisin, Jérémie; Thomas, Laetitia; Mies, Robert; Gros, Céline; Stark, Rainer; Samuel, Karine; Jochem, Roland; Boujut, Jean-François</i>	
Towards a model of the open-design process: Using the grounded theory for modelling implicit design processes	2-121
<i>Boisseau, Etienne; Bouchard, Carole; Omhover, Jean-François</i>	
An information model to estimate efforts of product development processes	2-131
<i>Dittmann, Claudia; Jacobs, Georg; Felix, Valerie</i>	
Process model for change management in the system of chassis-mounted parts of commercial vehicles	2-139
<i>Stocker, Johannes Michael; Thoma, Christoph; Schmidt, Michael; Kreimeyer, Matthias; Lienkamp, Markus</i>	
Parameter control assisting morphological product conceptualization of multi-technology-machine-tools.....	2-149
<i>Schmid, Alexander; Jacobs, Georg; Löwer, Manuel; Katzwinkel, Tim; Schmidt, Walter; Siebrecht, Justus</i>	
Efficient application of optimization methods by using concurrent and simultaneous optimization	2-159
<i>Wünsch, Andreas; Vajna, Sandor</i>	

Design Organisation and Management

Connecting strategy and execution in global R&D	2-169
<i>Sbernini, Federico; Granini, Nicola; Hansen, Zaza Nadja Lee</i>	
Modelling and simulating the effect of coordination on PD performance while handling change	2-179
<i>Rajapaksha, Janaka; Mirkovic, Katja; Robinson, David; Wynn, David</i>	
Identifying product development crises: The potential of adaptive heuristics.....	2-189
<i>Muenzberg, Christopher; Stingl, Verena; Geraldi, Joana; Oehmen, Josef</i>	
Neural network-based survey analysis of risk management practices in new product development.....	2-199
<i>Kampianakis, Andreas; Oehmen, Josef</i>	
Engineering design resource planning: A case study in identifying resource forecasting opportunities in research project planning.....	2-209
<i>Holliman, Alexander; Thomson, Avril; Hird, Abigail</i>	
Dynamic modelling of relationships in complex service design systems.....	2-219
<i>Hassannezhad, Mohammad; Cassidy, Steve; Clarkson, P. John</i>	
Design thinking - a paradigm	2-229
<i>Laursen, Linda Nhu; Tollestrup, Christian</i>	
Integrated approach to the agile development with design thinking in an industrial environment.....	2-239
<i>Grashiller, Michael; Luedke, Tobias; Vielhaber, Michael</i>	
Usability of processes in engineering design	2-249
<i>Becerril, Lucia; Stahlmann, Jan-Timo; Beck, Jesco; Lindemann, Udo</i>	
Challenges in managing new product introduction projects: An explorative case study.....	2-259
<i>Chirumalla, Koteswar</i>	
Applying lean thinking to risk management in product development	2-269
<i>Willumsen, Pelle; Oehmen, Josef; Rossi, Monica; Welo, Torgeir</i>	
Towards cross-linked development of highly complex products.....	2-279
<i>Toepfer, Ferdinand; Naumann, Thomas</i>	
Design of flexible product development processes - An automotive case study.....	2-289
<i>Hollauer, Christoph; Frisch, Bianca; Wilberg, Julian; Omer, Mayada; Lindemann, Udo</i>	
Identifying the influences on performance of engineering design and development projects	2-299
<i>Snider, Chris; Emanuel, Lia; Gopsill, James; Joel-Edgar, Sian; Hicks, Ben</i>	
On characterization of technology readiness level coefficients for design.....	2-309
<i>Fahimian, Mahi; Behdinan, Kamran</i>	
Assessment of back-up plan, delay, and waiver options at project gate reviews	2-317
<i>Olechowski, Alison; Eppinger, Steven; Joglekar, Nitin</i>	
Challenges for integrating sustainability in risk management – current state of research	2-327
<i>Schulte, Jesko; Hallstedt, Sophie</i>	
An empirical survey on efficiency improvement for the collaboration between design and simulation departments	2-337
<i>Schweigert, Sebastian; Xia, Minghai; Lindemann, Udo</i>	
Process model for data-driven business model generation	2-347
<i>Benta, Christian; Wilberg, Julian; Hollauer, Christoph; Omer, Mayada</i>	

A corpus-led approach on guidelines extraction from design thinking methodologies.....	2-357
<i>Rosa, Maiara; Nogueira, Giovana; Rozenfeld, Henrique</i>	
Towards a DT mindset tool evaluation: factors identification from theory and practice.....	2-367
<i>Paparo, Marco; Dosi, Clio; Vignoli, Matteo</i>	
Lean assessment and transformation strategies in product development: a longitudinal study	2-377
<i>Welo, Torgeir; Ringen, Geir</i>	
The coexistence of design thinking and stage and gate in the same organisational context – Challenges and need for integration	2-387
<i>Franchini, Giulia; Dosi, Clio; Vignoli, Matteo</i>	
Large-scale engineering prototyping - Approaching complex engineering problems CERN-style.....	2-397
<i>Gerstenberg, Achim; Steinert, Martin</i>	
Fitting squares into round holes: Enabling innovation, creativity, and entrepreneurship through corporate Fab Labs	2-407
<i>Fuller, Matt</i>	
Improving exploration capability by interacting with start-ups.....	2-417
<i>Buck, Lennart Sebastian; Nilsson, Susanne; Ritzén, Sofia</i>	
Proposition of a tools selection method to support and favour innovation for a manufacturing company.....	2-427
<i>Lacom, Pauline; Bazzaro, Florence; Sagot, Jean-Claude</i>	
Introduction to operations architecture for complexity management in product design and operations.....	2-437
<i>Oh, Kwansuk; Kim, Daeyoung; Hong, Yoo S.</i>	
Innovation processes in SMEs: Exploring the influence of varying degrees of control	2-447
<i>Karlsson, Anna; Öhrwall Rönnbäck, Anna; Lind, Erika</i>	
Applying multiple metrics in the performance measurement of design sessions in industry: a co-design case study.....	2-457
<i>Mombeshora, Mandy; Dekoninck, Elies; O'Hare, Jamie; Boujut, Jean-François; Cascini, Gaetano</i>	
Design thinking vs. systems thinking for engineering design: What's the difference?	2-467
<i>Greene, Melissa; Gonzalez, Richard; Papalambros, Panos; McGowan, Anna-Maria</i>	
Breakthrough technologies: principle feasibility debates	2-477
<i>Hein, Andreas Makoto; Jankovic, Marija; Condat, Hélène</i>	
Towards an assessment of resilience in telecom infrastructure projects using real options	2-487
<i>Mak, Jonathan; Cassidy, Steve; Clarkson, P. John</i>	
Modeling decisions in complex projects.....	2-497
<i>Siyam, Ghadir; Robinson, Robert Wilson; Kilpinen, Malia</i>	

TABLE OF CONTENTS

Volume 3: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Product, Services and Systems Design

Methodology for the contextual design of a modular product platform concept.....	3-1
<i>Schuh, Günther; Riesener, Michael; Barg, Sebastian; Lauf, Hendrik</i>	
Using point cloud technology for process simulation in the context of digital factory based on a systems engineering integrated approach	3-11
<i>Salehi, Vahid; Wang, Shirui</i>	
Assessing the financial potential for modularization: A case study in a global OEM	3-21
<i>Løkkegaard, Martin; Mortensen, Niels Henrik</i>	
Engineering value-effective healthcare solutions: A systems design perspective.....	3-31
<i>Patou, François; Maier, Anja</i>	
A multimethodology for hospital process redesign.....	3-41
<i>Lamé, Guillaume; Stal-Le Cardinal, Julie; Jouini, Oualid; Carvalho, Muriel; Tournigand, Christophe; Wolkenstein, Pierre</i>	
Integration of MBSE into existing development processes - Expectations and challenges	3-51
<i>Kößler, Johannes; Paetzold, Kristin</i>	
Lightweight visualization of SysML models in PDM systems	3-61
<i>Nigischer, Christian; Gerhard, Detlef</i>	
On the interplay between platform concept development and production maintenance	3-71
<i>Bokrantz, Jon; Landahl, Jonas; Levandowski, Christoffer; Skoogh, Anders; Johannesson, Hans; Isaksson, Ola</i>	
Integrating product development models and “in-product models”	3-81
<i>Aßmann, Gert; Stetter, Ralf</i>	
Framing key concepts to design a human centered urban mobility system	3-91
<i>Al Maghraoui, Ouail; Vallet, Flore; Puchinger, Jakob; Yannou, Bernard</i>	
An approach for holistic model-based engineering of industrial plants	3-101
<i>Hooshmand, Yousef; Adamenko, Dmytro; Kunnen, Steffen; Köhler, Peter</i>	
A CBR approach for supporting ecodesign with SysML	3-111
<i>Bougain, Sébastien Joël; Gerhard, Detlef</i>	
Directives to support the design of changeable (I)PSS.....	3-121
<i>Pessôa, Marcus Vinicius Pereira; Becker, Juan Manuel Jauregui</i>	
Assessment of modular platform potential in complex product portfolios of manufacturing companies	3-131
<i>Ortlieb, Casimir; Runge, Tim</i>	
Good product line architecture design principles	3-141
<i>Mortensen, Niels Henrik; Løkkegaard, Martin</i>	
Towards an impact model of modular product structures.....	3-151
<i>Hackl, Jennifer; Krause, Dieter</i>	
Extending system design tools to incorporate user- and contextual elements in developing future products and services.....	3-161
<i>Liem, André</i>	
Sensing behaviour in healthcare design	3-171
<i>Thorpe, Julia Rosemary; Forchhammer, Birgitte Hysse; Maier, Anja</i>	

Nurse-centred design: homecare nursing workarounds to fit resources and treat wounds.....	3-181
<i>Al-Masslawi, Dawood; Fels, Sidney; Lea, Rodger; Currie, Leanne M.</i>	
Supporting design platforms by identifying flexible modules	3-191
<i>Raudberget, Dag S.; Levandowski, Christoffer; André, Samuel; Isaksson, Ola; Elgh, Fredrik; Müller, Jakob; Johansson, Joel; Stolt, Roland</i>	
Trends, observations and drivers for change in systems engineering design	3-201
<i>Isaksson, Ola; Arnarsson, Ívar; Bergsjö, Dag; Catic, Amer; Gustafsson, Göran; Kaya, Onur; Landahl, Jonas; Levandowski, Christoffer; Malmqvist, Johan; Müller, Jakob; Raja, Visakha; Raudberget, Dag S.; Stenholm, Daniel; Ström, Mikael</i>	
Design prototyping of systems	3-211
<i>Camburn, Bradley Adam; Arlitt, Ryan; Perez, K. Blake; Anderson, David; Choo, Pui Kun; Lim, Terry; Gilmour, Adam; Wood, Kristin</i>	
Improving product configurability in ETO companies.....	3-221
<i>Markworth Johnsen, Sara Helene; Kristjansdottir, Katrin; Hvam, Lars</i>	
Service design for people with disabilities using context-based activity modelling and international classification of functioning, disability and health.....	3-231
<i>Lim, Myung Joon; Kim, Yong Se</i>	
Cost based design of modular product families using the example of test rigs.....	3-241
<i>Hanna, Michael; Ripperda, Sebastian; Krause, Dieter</i>	
Mechatronic modularization of intelligent technical systems	3-251
<i>Lipsmeier, Andre; Westermann, Thorsten; Anacker, Harald; Dumitrescu, Roman</i>	
Integrated process and data model for applying scenario-technique in requirements engineering	3-261
<i>Graessler, Iris; Scholle, Philipp; Pottebaum, Jens</i>	
Efficient application of MBSE using reference models: a PGE case study	3-271
<i>Müller, Marvin; Schiffbänker, Paul; Albers, Albert; Braun, Andreas; Bursac, Nikola</i>	
Model based systems engineering (MBSE) approach for configurable product use-case scenarios in virtual environments.....	3-281
<i>Mahboob, Atif; Weber, Christian; Husung, Stephan; Liebal, Andreas; Krömker, Heidi</i>	
"Elderpersonas" adapting personas to understand the real needs of elderly people	3-291
<i>Gonzalez de Heredia, Arantxa; Justel, Daniel; Iriarte, Ion; Lasa, Ganix</i>	
Using TRLs and system architecture to estimate technology integration risk	3-301
<i>Garg, Tushar; Eppinger, Steven; Joglekar, Nitin; Olechowski, Alison</i>	
Estimating the impact of systems engineers on systems design processes.....	3-311
<i>Collopy, Arianne; Greene, Melissa; Adar, Eytan; Papalambros, Panos</i>	
Towards a digital twin: How the blockchain can foster E/E-traceability in consideration of model-based systems engineering	3-321
<i>Heber, Dominik; Groll, Marco</i>	
An engineering approach to mapping meanings in products and services	3-331
<i>Waltersdorfer, Gregor; Gericke, Kilian; Desmet, Pieter; Blessing, Lucienne</i>	
Coping with the challenges of engineering smart product service systems - Demands for research infrastructure	3-341
<i>Kuhlenkötter, Bernd; Bender, Beate; Wilkens, Uta; Abramovici, Michael; Göbel, Jens Christian; Herzog, Michael; Hypki, Alfred; Lenkenhoff, Kay</i>	
Engineering design research methodologies in product-service systems: When the complex gets tough.....	3-351
<i>Ericson, Åsa; Lugnet, Johan; Wenngren, Johan</i>	

Design opportunities in mutual support service for the elderly	3-359
<i>Pahk, Yoonyee; Baek, Joon Sang</i>	
15 industry cases of product-service systems for manufacturing companies and their comparison framework.....	3-369
<i>Kim, Yong Se; Choe, Yunhwa</i>	
mecPro ² - A holistic concept for the model-based development of cybertronic systems.....	3-379
<i>Eigner, Martin; Dickopf, Thomas; Schneider, Marc; Schulze, Tim</i>	
Modeling the relationship between aviation original equipment manufacturers and maintenance, repair and overhaul enterprises from a product-service system perspective	3-389
<i>Goncalves, Cassio; Kokkolaras, Michael</i>	
Designing mental health delivery systems: Where do we start?	3-399
<i>Komashie, Alexander; Ray, Sarah; Kar Ray, Manaan; Clarkson, P. John</i>	
Variant management toolbox.....	3-409
<i>Braun, Thomas; Strattnner, Martin</i>	
Design principles of wearables systems: an IoT approach	3-417
<i>Stelvaga, Anastasia; Fortin, Clement</i>	

TABLE OF CONTENTS

Volume 4: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Design Methods and Tools

Towards Agile Product Development - The Role of Prototyping	4-1
<i>Böhmer, Annette Isabel; Hostettler, Rafael; Richter, Christoph; Lindemann, Udo; Conradt, Jörg; Knoll, Alois</i>	
The Analogy Retriever – an idea generation tool	4-11
<i>Han, Ji; Shi, Feng; Chen, Liuqing; Childs, Peter R. N.</i>	
Identifying variability key characteristics for automation design - A case study of finishing process.....	4-21
<i>Sanchez-Salas, Angel; Goh, Yee Mey; Case, Keith</i>	
Assessment of dependencies in mechatronics conceptual design of a quadcopter drone using linguistic fuzzy variables	4-31
<i>Chouinard, Ugo; Achiche, Sofiane; Leblond-Ménard, Cédric; Baron, Luc</i>	
Design guidelines for shoulder design of an anthropomorphic robotic arm	4-41
<i>Leroux, Martin; Achiche, Sofiane; Beaini, Dominique; Raison, Maxime</i>	
Biomimicry design tooling.....	4-51
<i>Stevens, Laura; de Vries, Marc; van den Broek, Jos; Rijken, Dick</i>	
An approach to handle uncertainty during the process of product modelling	4-59
<i>Würtenberger, Jan; Lotz, Julian; Freund, Tillmann; Kirchner, Eckhard</i>	
Assessment of changes in engineering design using change propagation cost analysis.....	4-69
<i>Rebentisch, Eric; Schuh, Günther; Riesener, Michael; Breunig, Stefan; Hoensbroeck, Ferdinand</i>	
A method for the tolerance analysis of bearing seats for cylindrical roller bearings in respect to operating clearance and fatigue life.....	4-79
<i>Aschenbrenner, Alexander; Wartzack, Sandro</i>	
Exploring the persona model as a tool to generate user insight through co-creation with users in the early phase of a design project	4-89
<i>Hansen, Jane Holm; Nielsen, Louise Møller</i>	
Nonlinear quality function deployment: An experimental analysis	4-99
<i>Bertoni, Marco; Bertoni, Alessandro</i>	
The role of multidisciplinary design optimization (MDO) in the development process of complex engineering products	4-109
<i>Papageorgiou, Athanasios; Ölvander, Johan</i>	
Knowledge management and eco-innovation: Issues and organizational challenges to small and medium enterprises	4-119
<i>Cherifi, Ahmed; Gardoni, Mickaël; M'Bassègue, Patrick; Renaud, Jean; Houssin, Rémy</i>	
The agile toolbox - Adaptation of agileMPPs to the mechatronic development process	4-129
<i>Goevert, Kristin; Baumgartner, Michael; Lindemann, Udo</i>	
Automotive styling: Supporting engineering-styling convergence through surface-centric knowledge based engineering.....	4-139
<i>Feldinger, Ulrich Ernst; Kleemann, Sebastian; Vietor, Thomas</i>	
Design for Control	4-149
<i>Stetter, Ralf; Simundsson, Avery</i>	
Design procedures in the development of an electromagnetic manipulator.....	4-159
<i>Al Mashagbeh, Mohammad; Al-Dulaimi, Thamir; Khamesee, Mir Behrad</i>	

A rapid algorithm for multi-objective Pareto optimization of modular architecture	4-169
<i>Sanaei, Roozbeh; Otto, Kevin; Wood, Kristin; Hölttä-Otto, Katja</i>	
Designing new concepts for household appliance with the help of TRIZ.....	4-179
<i>Baur, Christoph; Muenzberg, Christopher; Lindemann, Udo</i>	
Derivation, analysis and comparison of geometric requirements for various vehicle drivetrains using dimensional chains.....	4-189
<i>Felgenhauer, Matthias; Schöpe, Frank; Bayerlein, Michaela; Lienkamp, Markus</i>	
Agile development and the constraints of physicality: A network theory-based cause-and-effect analysis	4-199
<i>Schmidt, Tobias Sebastian; Chahin, Abdo; Kößler, Johannes; Paetzold, Kristin</i>	
Empirical study of ill-supported activities in variation risk identification and assessment in early stage product development.....	4-209
<i>Bjarklev, Kristian; Mortensen, Niels Henrik; Ebro, Martin</i>	
Towards non-hierarchical system descriptions for automating functional analysis	4-219
<i>Amrin, Andas; Spitas, Christos</i>	
Matrix-based system modelling to predict properties change propagation	4-229
<i>Luedke, Tobias; Kaspar, Jerome; Meiser, Philip; Schneberger, Jan-Henrik; Herrmann, Hans-Georg; Vielhaber, Michael</i>	
A function- and embodiment-based failure analysis method for an in-depth understanding of failure mechanisms	4-239
<i>Gladysz, Bartosz; Spandl, Lukas; Albers, Albert</i>	
Predicting and visualizing cost propagation due to engineering design changes	4-249
<i>Georgiades, Alex; Sharma, Sanjiv; Kipouros, Timoleon; Savill, Mark</i>	
OSLC based approach for product appearance structuring.....	4-259
<i>Ebeling, René; Eigner, Martin</i>	
Identifying affordances from online product reviews.....	4-267
<i>Hou, Tianjun; Yannou, Bernard; Leroy, Yann; Poirson, Emilie; Mata, Ivan; Fadel, Georges</i>	
Design for robustness - Systematic application of design guidelines to control uncertainty.....	4-277
<i>Freund, Tillmann; Würtenberger, Jan; Lotz, Julian; Rommel, Carmen; Kirchner, Eckhard</i>	
Prototyping shape-changing interfaces – An evaluation of living hinges' abilities to resemble organic, shape-changing interfaces	4-287
<i>Jensen, Matilde Bisballe; Blindheim, Jørgen; Steinert, Martin</i>	
Evolving LEGO: Prototyping requirements for a customizable construction kit	4-297
<i>Boa, Duncan; Mathias, David; Hicks, Ben</i>	
Designing the missing link between science and industry: Organizing partnership based on dual generativity.....	4-307
<i>Klasing Chen, Milena; Aknin, Patrice; Lagadec, Lilly-Rose; Laousse, Dominique; Le Masson, Pascal; Weil, Benoît</i>	
Enhanced integrated sensitivity analysis in model based QFD method.....	4-317
<i>Shabestari, Seyed Sina; Bender, Beate</i>	
Evaluation and management of customer feedback to include market dynamics into product development: Satisfaction Importance Evaluation (SIE) model.....	4-327
<i>Gupta, Ravi Kumar; Belkadi, Farouk; Bernard, Alain</i>	
Meta-model for VR-based design reviews	4-337
<i>Gebert, Martin; Steger, Wolfgang; Stelzer, Ralph; Bertelmann, Kathrin</i>	
Use case based methodology for conceptual design of industrial mechatronic products	4-347
<i>Scalice, Régis Kovacs; Berkenbrock, Gian Ricardo; Mendoza, Yesid Ernesto Asaff</i>	

An automated generation method of system architecture with component's multi-criterion evaluation	4-357
<i>Chen, Ruirui; Liu, Yusheng; Liu, Ying; Zhang, Zhinan; Ye, Xiaoping; Hu, Jie</i>	
Extended target weighing approach - Identification of lightweight design potential for new product generations.....	4-367
<i>Albers, Albert; Revft, Sven; Spadinger, Markus</i>	
An optimization-based approach for supporting early product architecture decisions	4-377
<i>Raja, Visakha; Isaksson, Ola; Kokkolaras, Michael</i>	
Integrated modeling of behavior and reliability in system development.....	4-385
<i>Hentze, Julian; Kaul, Thorben; Graessler, Iris; Sextro, Walter</i>	
Applying robust design methodology to a quadrotor drone	4-395
<i>Coulombe, Charles; Gamache, Jean-Francois; Mohebbi, Abolfazl; Chouinard, Ugo; Achiche, Sofiane</i>	
A network-based approach to identify lacking coordination using higher order links	4-405
<i>Weidmann, Dominik; Becerril, Lucia; Hollauer, Christoph; Kattner, Niklas; Lindemann, Udo</i>	
A crowdsourced design experiment using free-hand sketch design method based on the cDesign framework	4-415
<i>Wu, Hao; Corney, Jonathan</i>	
Using the ACD ³ -ladder to manage multi-phase requirements on end-user products.....	4-425
<i>Berlin, Cecilia; Bligård, Lars-Ola; Simonsen, Eva</i>	
Approaches to increasing method acceptance in agile product development processes	4-435
<i>Reiß, Nicolas; Albers, Albert; Bursac, Nikola</i>	
An approach to analyse the potential of tailored forming by TRIZ Reverse	4-445
<i>Brockmöller, Tim; Mozgova, Iryna; Lachmayer, Roland</i>	
Exploring the integration of social media feedback for user-oriented product development.....	4-453
<i>Deng, Quan; Franke, Marco; Hribernik, Karl; Thoben, Klaus-Dieter</i>	
From customer experience to product design: Reasons to introduce a holistic design approach	4-463
<i>Ceccacci, Silvia; Giraldi, Luca; Mengoni, Maura</i>	
User-driven segmentation of design data	4-473
<i>Maynard, Alex; Burnap, Alexander; Papalambros, Panos</i>	
User experience journeys	4-483
<i>Kremer, Simon; Krahl, Thilo; Lindemann, Udo</i>	
Generic generative design systems to imprint personalities in consumer products: Preliminary results	4-493
<i>Beghelli, Alejandra; Briede, Juan; Carrasco, Miguel; Prieto, Pablo</i>	
From simulation to inventive problem resolution, a global method	4-503
<i>Dubois, Sébastien; De Guio, Roland; Rasovska, Ivana; Ben Moussa, Fatima Zahra; Benmoussa, Rachid</i>	
Value-driven simulation: Thinking together through simulation in early engineering design	4-513
<i>Panarotto, Massimo; Wall, Johan; Bertoni, Marco; Larsson, Tobias; Jonsson, Pontus</i>	
The application of quality functional deployment to modular offsite construction products.....	4-523
<i>Wee, Tanawan Pang Yew; Aurisicchio, Marco; Starzyk, Ireneusz</i>	
Categorizing user pains, usage situations and existing solutions in front end of innovation: The case of smart lighting project.....	4-533
<i>Bekhradi, Alexandre; Yannou, Bernard; Cluzel, François; Vallette, Thomas</i>	
Do biomimetic students think outside the box?	4-543
<i>Lenau, Torben Anker</i>	

Does prototype format influence stakeholder design input?	4-553
<i>Deininger, Michael; Daly, Shanna; Sienko, Kathleen; Lee, Jennifer; Obed, Samuel; Effah Kaufmann, Elsie</i>	
Employing design representations for user-feedback in the product design lifecycle	4-563
<i>Ray, Samantak; Choi, Young Mi</i>	
Simulation of acoustic product properties in virtual environments based on artificial neural networks (ANN).....	4-573
<i>Siegel, Antje; Weber, Christian; Albers, Albert; Landes, David; Behrendt, Matthias</i>	
Design for relaxation: A model for understanding stress for designers	4-583
<i>Stoop, Michèle; Snelders, Dirk</i>	
A computational tool for virtual product development exploiting changeability knowledge	4-593
<i>Francalanza, Emmanuel; Borg, Jonathan; Constantinescu, Carmen</i>	
Detection and splitting of constructs of SAPPhIRE model to support automatic structuring of analogies	4-603
<i>Keshwani, Sonal; Chakrabarti, Amaresh</i>	
Change propagation management by active batching	4-613
<i>Oh, Gyesik; Hong, Yoo S.</i>	
Integrated structure-control design optimization of an unmanned quadrotor helicopter (UGH) for object grasping and manipulation	4-623
<i>Mohebbi, Abolfazl; Gallacher, Colin; Harrison, James; Willes, John; Achiche, Sofiane</i>	
A method for the expert-based identification of engineering change propagation.....	4-633
<i>Kattner, Niklas; Mehlstäubl, Jan; Becerril, Lucia; Hollauer, Christoph; Weidmann, Dominik; Lindemann, Udo</i>	
Bridging the semantic gap in customer needs elicitation: a machine learning perspective.....	4-643
<i>Wang, Yue; Zhang, Jian</i>	
Advanced innovation design approach for process engineering.....	4-653
<i>Casner, Didier; Livotov, Pavel</i>	
Expert based approach to analyse and influence indirect cost of engineering changes.....	4-663
<i>Schmied, Christian; Gebhardt, Marcel; Mörtl, Markus; Lindemann, Udo</i>	
Process integrated product concretisation: Extending conceptual design with function focus by processual product design	4-673
<i>Mattmann, Ilyas; Kloberdanz, Hermann; Kirchner, Eckhard</i>	
Decentralized handling of conflicts in multi-brand engineering change management.....	4-683
<i>Hesselmann, Carsten; Kehl, Stefan; Stiefel, Patrick; Müller, Jörg</i>	
Need network analysis: A process to understand the stakeholder need structure in multi-actor service systems.....	4-693
<i>Pakh, Yoonyee; Baek, Joon Sang</i>	
A geometric approach to tolerance analysis: Contribution to the robust design of flexible assemblies	4-703
<i>Schluer, Christoph; Gust, Peter; Mersch, Frank; Diepschlag, Falko; Sersch, Alina</i>	
On the relationship between affordance and expected performance	4-711
<i>De Benetti, Nicolo; Fantoni, Gualtiero; Chiarello, Filippo; Bonaccorsi, Andrea; Fadel, Georges; Mata, Ivan</i>	
Predicting indirect process costs of engineering change based on a task characteristic perspective	4-721
<i>Gebhardt, Marcel</i>	

TABLE OF CONTENTS

Volume 5: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Design for X, Design to X

A design method for restriction oriented lightweight design by using selective laser melting	5-1
<i>Lippert, Bastian; Lachmayer, Roland</i>	
Implementation of lightweight design in the product development process of unmanned aerial vehicles	5-11
<i>Junk, Stefan; Schröder, Werner; Hangst, Nikolai</i>	
Value chains and digitization of product development processes	5-21
<i>Meussen, Bernhard</i>	
Realisation of self-replicating production resources through tight coupling of manufacturing technologies	5-31
<i>Goudswaard, Mark; Hicks, Ben; Nassehi, Aydin; Mathias, David</i>	
A methodical approach to support ideation for additive manufacturing in design education	5-41
<i>Watschke, Hagen; Bavendiek, Ann-Kathrin; Giannakos, Alexander; Vietor, Thomas</i>	
An approach to implement design for additive manufacturing in engineering studies	5-51
<i>Lippert, Bastian; Leuteritz, Georg; Lachmayer, Roland</i>	
Product sustainability assessment in conceptualisation phase	5-61
<i>Martinez, Victor Gerardo</i>	
Increasing product attachment through personalised design of additively manufactured products.....	5-71
<i>Campbell, Robert Ian; Bernabei, Roberta</i>	
New ways of hygienic design – A methodical approach.....	5-81
<i>Beetz, Jean-Paul; Kloberdanz, Hermann; Kirchner, Eckhard</i>	
Design heuristics for additive manufacturing	5-91
<i>Blösch-Paidosh, Alexandra; Shea, Kristina</i>	
Using additive manufacturing to design adaptive user interfaces – Lessons learned from a DfAM process.....	5-101
<i>Weiss, Florian; Janny, Benedikt; Binz, Hansgeorg; Maier, Thomas; Roth, Daniel</i>	
Why choose one sustainable design strategy over another: A decision-support prototype	5-111
<i>Gould, Rachael; Lagun Mesquita, Patricia; Bratt, Cecilia; Broman, Göran</i>	
Systematic approach to optimize cost drivers based on life cycle cost modeling.....	5-121
<i>Johannknecht, Florian; Gatzen, Matthias; Lachmayer, Roland</i>	
An assembly-oriented product design methodology to develop similar assembly operations in a mixed-product assembly line	5-131
<i>Asadi, Narges; Jackson, Mats; Augustsson, Per; Fundin, Anders</i>	
Additive repair design approach: Case study to repair aluminium base components	5-141
<i>Zghair, Yousif Amsad; Lachmayer, Roland</i>	
Towards real-time feedback on manufacturability for engineering designers directly from manufacturers	5-151
<i>Weissenbach, Paul; Gerhard, Detlef</i>	
Complexity theory as an epistemological approach to sustainability assessment methods definition.....	5-159
<i>Nigra, Marianna</i>	
Cyber-physical effects on the virtual commissioning architecture	5-169
<i>Illmer, Benjamin; Kaspar, Jerome; Vielhaber, Michael</i>	

Design challenges in energy conservation strategies for shared spaces.....	5-179
<i>Withanage, Chathura; Blessing, Lucienne; Wood, Kristin</i>	
Is it sustainable? A conceptual exposition of sustainability in technical artefacts	5-189
<i>Hay, Laura; Duffy, Alex</i>	
An end of life oriented framework to support the transition toward circular economy	5-199
<i>Marconi, Marco; Germani, Michele</i>	
Life cycle development - A closer look at strategies and challenges for integrated life cycle planning and upgrading of complex systems	5-209
<i>Cudok, Anja; Huth, Tobias; Inkermann, David; Vietor, Thomas</i>	
Democratisation of design for functional objects manufactured by fused deposition modelling (FDM): Lessons from the design of three everyday artefacts.....	5-219
<i>Goudswaard, Mark; Hicks, Ben; Gopsill, James; Nassehi, Aydin</i>	
Sustainability integration in a technology readiness assessment framework	5-229
<i>Hallstedt, Sophie; Pigosso, Daniela</i>	
Design for privacy in public space	5-239
<i>Cho, Kwangmin; Kim, Chajoong</i>	
Performance monitoring and control for an additive manufacturing factory - A case study in the aerospace industry.....	5-249
<i>Judalet, Nicolas; Kazakci, Akin; Le Gouguec, Emmanuel; Balvay, Arnaud</i>	
Assessing the performance of additive manufacturing applications	5-259
<i>Türk, Daniel-Alexander; Fontana, Filippo; Rüegg, Fabian; Gill, Rajan Joshua; Meboldt, Mirko</i>	
Future-adaptability for energy and resource efficient vehicles.....	5-269
<i>Nyström, Thomas; Svengren Holm, Lisbeth; van Loon, Patricia</i>	
Fundamental challenges in developing Internet of Things applications for engineers and product designers.....	5-279
<i>Heinis, Timon; Gomes Martinho, Carlos; Meboldt, Mirko</i>	
Codesign of sustainable performance objectives in a food value chain.....	5-289
<i>Petit, Gaëlle; Yannou-Le Bris, Gwenola; Trystram, Gilles</i>	
How can design science contribute to a circular economy?.....	5-299
<i>Pigosso, Daniela; McAloone, Tim</i>	
The need for effective design guides in additive manufacturing.....	5-309
<i>Seepersad, Carolyn Conner; Allison, Jared; Sharpe, Conner</i>	
From privacy by design to design for privacy	5-317
<i>Rostama, Guilda; Bekhradi, Alexandre; Yannou, Bernard</i>	
A framework for designing end use products for direct manufacturing using additive manufacturing technologies.....	5-327
<i>Zhu, Zicheng; Pradel, Patrick; Bibb, Richard; Moultrie, James</i>	
A new method for designing porous implant	5-337
<i>Yang, Huiyuan; Zhao, Yaoyao</i>	
Additive manufacturing and the product development process: Insights from the space industry	5-345
<i>Lindwall, Angelica; Dordlofva, Christo; Öhrwall Rönnbäck, Anna</i>	
A review of key dimensions for designing environment-driven collaboration practices with external business partners....	5-355
<i>Stewart, Raphaëlle; Boks, Casper; Bey, Niki</i>	
A design to cost method for electric cable harness	5-365
<i>Mandolini, Marco; Cicconi, Paolo; Castorani, Vincenzo; Vita, Alessio; Germani, Michele</i>	

Interdisciplinary life cycle data analysis within a knowledge-based system for product cost estimation	5-375
<i>Altavilla, Stefania; Montagna, Francesca; Newnes, Linda</i>	
An exploration of company personas to support customized DfS implementation	5-385
<i>Ali, Faheem; Boks, Casper; Bey, Niki</i>	
Towards a top-down design methodology for 4D printing	5-395
<i>Sossou, Germain; Demoly, Frédéric; Montavon, Ghislain; Gomes, Samuel</i>	

TABLE OF CONTENTS

Volume 6: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Design Information and Knowledge

Knowledge based support for the designer at the interface of CAD/CAE.....	6-1
<i>Andrae, Rene; Köhler, Peter</i>	
Towards robust inter-organizational synergy: Perceived quality knowledge transfer in the automotive industry.....	6-11
<i>Stenholm, Daniel; Styliidis, Konstantinos; Bergsjö, Dag; Söderberg, Rikard</i>	
Concept for a simulation model to analyze knowledge conversions within the product development process.....	6-21
<i>Laukemann, Alexander; Binz, Hansgeorg; Roth, Daniel</i>	
Automatic design structure matrices: A comparison of two formula student projects	6-31
<i>Gopsill, James; Snider, Chris; Emanuel, Lia; Joel-Edgar, Sian; Hicks, Ben</i>	
Improving engineering information retrieval by combining TD-IDF and product structure classification.....	6-41
<i>Jones, David; Matthews, Jason; Xie, Yifan; Gopsill, James; Dotter, Martin; Chanchevrier, Nicolas; Hicks, Ben</i>	
Development of a knowledge-based system for help in decision making: A medical application	6-51
<i>Coton, Justine; Thomann, Guillaume; Villeneuve, François</i>	
Design space visualization for efficiency in knowledge discovery leading to an informed decision	6-61
<i>Abi Akle, Audrey; Yannou, Bernard; Minel, Stéphanie</i>	
A clustering and word similarity based approach for identifying product feature words	6-71
<i>Suryadi, Dedy; Kim, Harrison</i>	
Framework of mechanical design knowledge representations for avoiding patent infringement	6-81
<i>Jiang, Pingfei; Atherton, Mark; Harrison, David; Malizia, Alessio</i>	
Technical inheritance: Information basis for the identification and development of product generations	6-91
<i>Mozgova, Iryna; Barton, Sebastian; Demminger, Christian; Miebach, Timo; Taptimthong, Piriya; Lachmayer, Roland; Nyhuis, Peter; Reimche, Wilfried; Wurz, Marc Christopher</i>	
Product description in terms of advantages and drawbacks: Exploiting patent information in novel ways	6-101
<i>Chiarello, Filippo; Fantoni, Gualtiero; Bonaccorsi, Andrea</i>	
The knowledge benchmarking process framework: A new basis to analyze megaprojects challenges and practices.....	6-111
<i>Mbassegue, Patrick; Gardoni, Mickaël; Tahboub, Zain</i>	
Supporting development teams in the early stages of product development through DfX-based knowledge management system and communication platform.....	6-121
<i>Ugurlu, Sinan; Gerhard, Detlef</i>	
Knowledge-based engineering applications for supporting the design of precast concrete facade panels	6-131
<i>Montali, Jacopo; Overend, Mauro; Pelken, P. Michael; Sauchelli, Michele</i>	
From elicitation to structuring of additive manufacturing knowledge	6-141
<i>Grandvallet, Christelle; Pourroy, Franck; Prudhomme, Guy; Vignat, Frédéric</i>	
k-MORE - A methodology to manage documented knowledge for reuse.....	6-151
<i>Carro Saavedra, Cristina; Lindemann, Udo</i>	
The difficulties reported by engineers in searching information	6-161
<i>Zhang, Shuai; Johnson, Aylmer</i>	
Gathering and analysing external influences on the product design - a case study.....	6-169
<i>Kammerl, Daniel; Echle, Stefan; Mörtl, Markus</i>	

Mediating constraints across design and manufacturing using platform-based manufacturing operations.....	6-179
<i>Landahl, Jonas; Madrid, Julia; Levandowski, Christoffer; Johannesson, Hans; Söderberg, Rikard; Isaksson, Ola</i>	
A new knowledge management tool for product development in micro-companies.....	6-189
<i>Huret, Martin; Jean, Camille; Segonds, Frédéric</i>	
Functional surfaces as initial product design concept in 3D-CAD-Systems	6-197
<i>Katzwinkel, Tim; Jacobs, Georg; Löwer, Manuel; Schmid, Alexander; Schmidt, Walter; Siebrecht, Justus</i>	
A new "knowledge-based engineering" guideline.....	6-207
<i>Luft, Thomas; Roth, Daniel; Binz, Hansgeorg; Wartzack, Sandro</i>	
Structuring information in technical inheritance with PDM systems.....	6-217
<i>Scheidel, Wieben; Mozgova, Iryna; Lachmayer, Roland</i>	
Modularization: Exploring opportunities for knowledge transfer between the mechanical engineering and construction industry.....	6-227
<i>Kohl, Markus; Wilberg, Julian; Tommelein, Iris; Pikas, Ergo; Lindemann, Udo</i>	
Maturity of models in a multi-model decision support system.....	6-237
<i>Johansson, Christian; Wall, Johan; Panarotto, Massimo</i>	
Lessons learnt from experts in design rationale knowledge capture.....	6-247
<i>Hall, Mark; Bermell-Garcia, Pablo; Ravindranath, Ranjit; McMahon, Christopher</i>	
Improved codification and transfer of engineering knowledge through human intermediaries	6-257
<i>Ruck, Tobias; Albers, Albert; Reiß, Nicolas</i>	
Support management of product families and the corresponding automation systems – A method to capture and share design rationale	6-267
<i>Poorkiany, Morteza; Johansson, Joel; Elgh, Fredrik</i>	
Climbing C-trees: Analysing Concept-tree content and construction	6-277
<i>Blanco, Eric; Le Dain, Marie-Anne; Lavayssiere, Pierre; Chevrier, Pierre</i>	
Information rich mapping requirement to product architecture through functional system deployment: The Multi Entity Domain Approach.....	6-287
<i>Haiksdóttir, Dagný; Mortensen, Niels Henrik</i>	
Information extracted from patents as creative stimuli for product innovation	6-297
<i>Parvin, Mehdi; Cascini, Gaetano; Becattini, Niccolo</i>	
A visual analysis of technical knowledge evolution based on patent data	6-307
<i>Smoyer, Vladimir; Potočki, Eva; Štorga, Mario</i>	
Modeling product co-consideration relations: A comparative study of two network models.....	6-317
<i>Sha, Zhenghui; Wang, Mingxian; Huang, Yun; Contractor, Noshir; Fu, Yan; Chen, Wei</i>	
Utilizing unstructured feedback data from MRO reports for the continuous improvement of standard products.....	6-327
<i>Abramovici, Michael; Gebus, Philip; Göbel, Jens Christian; Savarino, Philipp</i>	
How explicit are we in a design meeting: Investigation on meeting knowledge structuring with design rationale	6-337
<i>Dai, Xinghang; Velde, Frank</i>	
Framework of the evolution in virtual product modelling and model management towards digitized engineering.....	6-345
<i>Bitzer, Michael; Eigner, Martin; Faißt, Karl-Gerhard; Muggeo, Christian; Eickhoff, Thomas</i>	
Definition and support of differentiation and integration in mechanical structure using S-curve theory and wavelet transform	6-355
<i>Ishii, Takahiro; Parque, Victor; Miura, Satoshi; Miyashita, Tomoyuki</i>	

TABLE OF CONTENTS

Volume 7: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Design Theory and Research Methodology

A method for systematic elaboration of research phenomena in design research.....	7-1
<i>Horvath, Imre</i>	
The PSI matrix – A framework and a theory of design.....	7-11
<i>Reich, Yoram; Subrahmanian, Eswaran</i>	
Mining data to design value: A demonstrator in early design	7-21
<i>Bertoni, Alessandro; Larsson, Tobias; Larsson, Jonas; Elfsberg, Jenny</i>	
The development of a novel standardisation-customisation continuum.....	7-31
<i>Heredia Jiménez, Juan Antonio; Whitfield, Robert Ian; Ward, Michael; Grierson, Hilary</i>	
Data-driven engineering design research: Opportunities using open data.....	7-41
<i>Parraguez, Pedro; Maier, Anja</i>	
Rise and fall of platforms: Systematic analysis of platform dynamics thanks to axiomatic design	7-51
<i>Legrand, Julien; Thomas, Maxime; Le Masson, Pascal; Weil, Benoît</i>	
Studying design abduction in the context of novelty	7-61
<i>Kroll, Ehud; Koskela, Lauri</i>	
Design analytics is the answer, but what questions would product developers like to have answered?	7-71
<i>Arnarsson, Ívar Örn; Gustavsson, Emil; Malmqvist, Johan; Jirstrand, Mats</i>	
Decision design and re-ordering preferences: The case of an exploration project in a large firm	7-81
<i>Le Glatin, Mario; Le Masson, Pascal; Weil, Benoît</i>	
Investigating usage data support in development processes - A case study	7-91
<i>Höhn, Manuel; Hollauer, Christoph; Wilberg, Julian; Kammerl, Daniel; Mörtl, Markus; Omer, Mayada</i>	
What do we need to say about a design method?	7-101
<i>Gericke, Kilian; Eckert, Claudia; Stacey, Martin</i>	
Structure sharing for resource effective solutions: Improving measures to account for importance and quality of functions.....	7-111
<i>Ghazanfari, Ehsan; Singh, Vishal</i>	
Theoretical explanation of “Y-gaya” through general design theory.....	7-121
<i>Oizumi, Kazuya; Aoyama, Kazuhiko</i>	
The beginning of a new era: Using design thinking to identify dimensions for product assessment	7-131
<i>de Paula, Danielly; Menning, Axel; Ewald, Benedikt; Cormican, Kathryn</i>	
A category of design steps	7-141
<i>Breiner, Spencer; Subrahmanian, Eswaran</i>	
Concept for investigating the application of methods in product development.....	7-151
<i>Gust, Peter; Kuhlmeier, Marco; Garbe, Marie; Kampa, Sebastian</i>	
Enhancing the balancing while synthesizing-process - a method development project.....	7-161
<i>Noubarpour, Dennis</i>	
Ekphrasis as a design method	7-171
<i>Gero, John</i>	

TABLE OF CONTENTS

Volume 8: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Human Behaviour in Design

Evaluating the influences of heterogeneous combinations of internal/external factors on product design	8-1
<i>Filippi, Stefano; Barattin, Daniela</i>	
Studying design fixation with a computer-based task.....	8-11
<i>Neroni, Maria Adriana; Vasconcelos, Luis Arthur; Crilly, Nathan</i>	
Modal shifts in concentration indicate creativity	8-21
<i>Nguyen, Philon; Zeng, Yong</i>	
Similarities and differences between humorous and surprising products	8-31
<i>Borgianni, Yuri; Hatcher, Gillian</i>	
User involvement in pharmaceutical packaging design – A case study	8-41
<i>Lorenzini, Giana Carli; Olsson, Annika; Larsson, Andreas</i>	
Human-centred design blending smart technology with emotional responses: Case study on interactive clothing for couples	8-51
<i>Weizhen, Wang; Nagai, Yukari; Yuan, Fang</i>	
Target based analysis - A model to analyse usability tests based on mobile eye tracking recordings.....	8-59
<i>Mussgnug, Moritz; Sadowska, Aleksandra; Moryson, Ralf; Meboldt, Mirko</i>	
Multisensory product development.....	8-69
<i>Fels, Antonia; Falk, Björn; Schmitt, Robert</i>	
Necessary extension of conventional idea processes by means of a method for the identification of radical product ideas.....	8-79
<i>Herrmann, Thorsten; Binz, Hansgeorg; Roth, Daniel</i>	
Blow Bits: Creative playgrounds, gamification and virtuosity with hybrid design tools and environments (HDTE)	8-89
<i>Wendrich, Robert</i>	
Design variation through richness of rules embedded in LEGO bricks.....	8-99
<i>Mathias, David; Boa, Duncan; Hicks, Ben; Snider, Chris; Bennett, Peter; Taylor, Colin</i>	
The emotive qualities of patterns: Insights for design	8-109
<i>Urquhart, Lewis William Robert; Wodehouse, Andrew</i>	
Tool for creating a defined task as preparation for a target-oriented idea generation process.....	8-119
<i>Herrmann, Thorsten; Binz, Hansgeorg; Roth, Daniel</i>	
Taking into account life situation during a co-creativity session: An exploratory study.....	8-129
<i>Lobbé, Justine; Bazzaro, Florence; Charrier, Marjorie; Sagot, Jean-Claude</i>	
Fostering ideation in the very early design phases: How textual, pictorial and combined stimuli affect creativity.....	8-139
<i>Borgianni, Yuri; Rotini, Federico; Tomassini, Marco</i>	
Using embedded design structures to unravel a complex decision in a product development system	8-149
<i>McKay, Alison; Sammonds, George; Ahmed-Kristensen, Saeema; Irnazarow, Aleksandra; Robinson, Mark</i>	
Kansei modeling methodology for multisensory UX design	8-159
<i>Yanagisawa, Hideyoshi; Miyazaki, Chihiro; Bouchard, Carole</i>	
Elements to the development of a creativity technique	8-169
<i>Medeiros Leopoldino, Kleidson; Aguirre González, Mario; de Oliveira Ferreira, Paula; de Melo, David; de Vasconcelos, Rafael</i>	

Design fixation to examples: A study on the time decay of fixation	8-179
<i>Viswanathan, Vimal Kumar</i>	
Building a computational laboratory for the study of team behaviour in product development	8-189
<i>Perišić, Marija Majda; Štorga, Mario; Gero, John</i>	
Proposal for a new usability index for product design teams and the general public	8-199
<i>Brandy, Anthony; Mantelet, Fabrice; Aoussat, Améziane; Pigot, Pierre-Vincent</i>	
Calculation of design cognitive features based on complex linkography-network	8-209
<i>Xu, Jiang; Chuai, Ying; Wang, Xiuyue; Sun, Gang</i>	
Types of people in communal development projects in construction sector: Are they effective together?	8-219
<i>Latvala, Marika; Singh, Vishal</i>	
Exploring the decomposition of team design activity	8-229
<i>Martinec, Tomislav; Škec, Stanko; Štorga, Mario</i>	
A hand gesture-based interface for design review using leap motion controller	8-239
<i>Xiao, Yu; Peng, Qingjin</i>	
The idea mapping board: A tool for assessing design concepts and visualizing a team's use of the design space	8-249
<i>Helm, Kevin; Henderson, Daniel; Jablokow, Kathryn; Daly, Shanna; Yilmaz, Seda; Silk, Eli; Sevier, Daniel</i>	
Three driven approaches to combinational creativity	8-259
<i>Han, Ji; Park, Dongmyung; Shi, Feng; Chen, Liuqing; Childs, Peter R. N.</i>	
Designing with LEGO: Exploring the influence of low fidelity visualisation on collaborative design activities	8-269
<i>Ranscombe, Charlie; Bissett-Johnson, Katherine; Boa, Duncan; Hicks, Ben</i>	
An exploration of design synthesis	8-279
<i>McTeague, Chris; Duffy, Alex; Campbell, Gerard; Grealy, Madeleine; Hay, Laura; Pidgeon, Laura; Vuletic, Tijana</i>	
Which are the limitations of ICT tools for collaborative design with suppliers?	8-289
<i>Talas, Yassine; Gzara, Lilia; Le Dain, Marie-Anne; Merminod, Valéry; Frank, Alejandro Germán</i>	
Investigating the relationship between customer emotions and sportsbike aesthetics	8-299
<i>Mamo, James; Farrugia, Philip; Sant, Tonio</i>	
Investigating effects of stimuli on ideation outcomes.....	8-309
<i>Venkataraman, Srinivasan; Song, Binyang; Luo, Jianxi; Subburaj, Karupppasamy; Elara, Mohan Rajesh; Blessing, Lucienne; Wood, Kristin</i>	
The best of three worlds - The creation of InnoDev a software development approach that integrates Design Thinking, Scrum and Lean Startup	8-319
<i>Dobrigkeit, Franziska; de Paula, Danielly</i>	
Defining the requirement for a direct vision standard for trucks using a DHM based blind spot analysis.....	8-329
<i>Summerskill, Stephen; Marshall, Russell</i>	
A study on the impact of HOVER platforms on design teams collaborative behaviors during collocated collective early preliminary design activities	8-339
<i>Guerra, Andrea Luigi; Gidel, Thierry; Vezzetti, Enrico</i>	
Interrelations between processes, methods, and tools in collaborative design - A framework.....	8-349
<i>Bavendiek, Ann-Kathrin; Inkermann, David; Vietor, Thomas</i>	
Design of a smart alarm clock to foster sustainable urban mobility	8-359
<i>Monici, Dario; Graziosi, Serena; Ferrise, Francesco; Bordegoni, Monica</i>	

Exploring human behaviour in design education: Supporting sustainable decision-making with a tabletop activity	8-369
<i>Willis, Amanda; Wise, Alyssa; Antle, Alissa</i>	
An objective methodology for blind spot analysis of HGVs using a DHM approach	8-379
<i>Marshall, Russell; Summerskill, Stephen</i>	
Creativity as a way to innovate successfully	8-389
<i>Guenther, Agnes; Eisenbart, Boris; Dong, Andy</i>	
Show me the pictures: The effect of representational modalities on abductive reasoning in decision making	8-399
<i>Arntz, Sarah; Verbaan, Ruben; Eisenbart, Boris; Cardoso, Carlos</i>	
Business game and its relationship with creativity: a systematic literature review	8-409
<i>Rosa, Marcela; González, Mario; Araújo, Ana Cláudia Costa de; Santiago, George</i>	
Designer's identity: Development of personal attributes and design skills over education.....	8-419
<i>Kunrath, Kamila; Cash, Philip; Li-Ying, Jason</i>	
Material perception and material identification in product design	8-429
<i>Dacleu Ndengue, Jessica; Juganaru-Mathieu, Mihaela; Faucheu, Jenny</i>	
Experiential qualities of science museum exhibits: a thematic analysis	8-439
<i>Ocampo-Agudelo, Jose; Maya, Jorge</i>	
Can visual facilitation beat verbal facilitation?.....	8-449
<i>Boedhoe, Roché; Badke-Schaub, Petra</i>	
Co-creation with diverse actors for sustainability innovation.....	8-459
<i>Sopjani, Liridon; Hesselgren, Mia; Ritzén, Sofia; Janhager Stier, Jenny</i>	
Underlying design motivations in design methods and outcomes	8-469
<i>Turner, Cameron; Agyemang, Malena</i>	
Characterisation of a co-creative design session through the analysis of multi-modal interactions	8-479
<i>Becattini, Niccolo; Masclet, Cedric; Ben-Guefrache, Fatma; Prudhomme, Guy; Cascini, Gaetano; Dekoninck, Elies</i>	
Fostering collaborative project emergence through divergence of opinion	8-489
<i>Ambrosino, Julien; Masson, Dimitri; Abi Akle, Audrey; Legardeur, Jérémie</i>	
On the products and experiences that make us happy.....	8-499
<i>Yang, Xi; Aurisicchio, Marco; Mackrill, James; Baxter, Weston</i>	
Positive and negative contamination in user interactions.....	8-509
<i>Baxter, Weston; Aurisicchio, Marco; Mugge, Ruth; Childs, Peter R. N.</i>	
The attentional capture of colour in visual interface design: a controlled-environment study	8-519
<i>Andersen, Emil; Maier, Anja</i>	
Using crowdsourcing to provide analogies for designer ideation in a cognitive study.....	8-529
<i>Goucher-Lambert, Kosa; Cagan, Jonathan</i>	
Heterogeneous engineering: Essential bridge implementing creative design.....	8-539
<i>Smulders, Frido</i>	
The practical side of engineering design	8-549
<i>Winkelmann, Paul Martin</i>	
Prototypical product shapes as a tool for aesthetic product design	8-559
<i>Maya, Jorge; Betancur-Rodríguez, Daniel</i>	

Design finds a way: Creative strategies to cope with barriers to creativity	8-569
<i>Gonçalves, Milene</i>	
Proposing a new product creativity assessment tool and a novel methodology to investigate the effects of different types of product functionality on the underlying structure of factor analysis.....	8-579
<i>Hazeri, Kamyar; Childs, Peter R. N.; Cropley, David</i>	
Learning by migrating: A computational study of diversity and team-level decision-making	8-589
<i>Thomas, Russell; Gero, John</i>	
Identifying opportunities for the implementation of UX design in industrial goods development	8-599
<i>Wölfel, Christian; Gärtner, Frank; Krzywinski, Jens; Siwek, Sandra</i>	
Literature based review of a collaborative design taxonomy	8-607
<i>Righter, James; Chickarello, Doug; Stidham, Hallie; O'Shields, Steven; Patel, Apurva; Summers, Joshua</i>	
Patches in sketches: Which type of sketch is more valuable for the end-user in the early phase of new product development.....	8-617
<i>Klapwijk, Anna Jeannette; Kostoulas, Nemo; Badke-Schaub, Petra</i>	

TABLE OF CONTENTS

Volume 9: Proceedings of the 21st International Conference on Engineering Design (ICED17)

Design Education

Enhancements in engineering design education at Austrian HTL	9-1
<i>Probst, Andreas; Gerhard, Detlef; Ramaseder, Norbert; Ebner, Martin</i>	
Providing a conducive environment to integrate design and production: Assessing the potentials of university-based fablabs (Ub-Fablabs)	9-11
<i>Botleng, Vomaranda; Brunel, Stéphane; Girard, Philippe</i>	
Integrated product development project in a multi-cultural and multi-professional background team: challenges and key success factors	9-21
<i>Lippert, Bastian; Ahrens, Martin; Dekhiar, Jonathan; Louhichi, Rim; Song, Young-Woo; Toepfer, Ferdinand; Briede, Juan; Vajna, Sandor; Paetzold, Kristin; Borg, Jonathan</i>	
Success factors of an IPD based approach in a remote multidisciplinary team environment - Reflections on a case study ...	9-31
<i>Asadi, Narges; Guaragni, Fausto; Johannknecht, Florian; Saidani, Michael; Scholle, Philipp; Borg, Jonathan; Panasiuk, Daryna</i>	
Experiences of product engineering conceptual design with patent drafting	9-41
<i>Lloveras, Joaquim</i>	
An educational method for enhancing the ability to design innovative products	9-49
<i>Yamada, Kaori; Tsumaya, Akira; Taura, Toshiharu; Shimada, Kenji; Kaihara, Toshiya; Yokokohji, Yasuyoshi; Sato, Ryuta</i>	
The use of social network sites in a global engineering design project.....	9-59
<i>Brisco, Ross; Whitfield, Robert Ian; Grierson, Hilary</i>	
A descriptive study of the effect of K-12 design education on changes in self-esteem	9-69
<i>Broussard, Kaylin; Murphy, Lauren; Fu, Katherine Kai-Se</i>	
Examining entrepreneurial motivations in an education context.....	9-79
<i>Lynch, Matthew; Slåttsveen, Kristoffer; Lozano, Federico; Steinert, Martin; Andersson, Gunnar</i>	
What green design activities and mindsets drive innovation and sustainability in student teams?.....	9-89
<i>Faludi, Jeremy; Agogino, Alice; Beckman, Sara; Iles, Alastair</i>	
Discursive vs. intuitive - An experimental study to facilitate the use of design catalogues.....	9-99
<i>Üreten, Selin; Krause, Dieter</i>	
Social innovation in the curriculum: a model for community engagement and design intervention	9-109
<i>de Vere, Ian; Charny, Daniel</i>	
Dropping concept bombs: Arguing for a knowledge-focused intervention in sketching to stimulate student engagement with visual thinking.....	9-119
<i>Ranscombe, Charlie; Bissett-Johnson, Katherine; Kuys, Blair</i>	
Exploitation of micro-learning for generating personalized learning paths.....	9-129
<i>Rusak, Zoltan</i>	
Correlation between team composition and team performance in virtual student product development teams	9-139
<i>Vukasinovic, Nikola; Cok, Vanja; Zavbi, Roman</i>	
Using studio teaching as an initiator and driver for research collaboration in design.....	9-149
<i>Liem, André; Ruecker, Stan; Alfonso de la Rosa, Juan</i>	

Makerbox: Introducing a low threshold maker experience for everyone – An online facilitation platform for problem based projects.....	9-159
<i>Slåttsveen, Kristoffer; Nygaard, Truls; Seviour, Georgina; Steinert, Martin; Aasland, Knut Einar</i>	
Navigating the common approaches to product development.....	9-169
<i>Vance, Julia K.; Giambalvo, Jack; Hoffenson, Steven</i>	
Towards assessing student gains in systems thinking during engineering design.....	9-179
<i>Tomko, Megan; Nelson, Jacob; Linsey, Julie; Bohm, Matt; Nagel, Robert</i>	
First View DesignLab: A fuzzy front end platform for innovation and education	9-189
<i>Hernandez-Monsalve, Maria Cristina; Velasquez-Montoya, Marcela; Mejia-Gutierrez, Ricardo; Hohn, Helga; Tassoul, Marc</i>	
Rapid prototyping products mapping live-data streams into tangible user interfaces.....	9-199
<i>Carulli, Marina; Bordegoni, Monica</i>	
Educational games for design and innovation: Proposition of a new taxonomy to identify perspectives of development...	9-209
<i>Cortes Sobrino, Ana; Bertrand, Miliane; Di Domenico, Enzo; Jean, Camille; Maranzana, Nicolas</i>	
Improving the sketching ability of engineering design students.....	9-217
<i>Hilton, Ethan Clark; Paige, Myela; Williford, Blake; Li, Wayne; Hammond, Tracy; Linsey, Julie</i>	
Reflection on classroom assessment in capstone design.....	9-225
<i>Brennan, Robert; Li, Simon</i>	
Differences between the discerning and opportunistic mind-sets in design learning.....	9-235
<i>Hamat, Basyarah; Eisenbart, Boris; Schoormans, Jan; Badke-Schaub, Petra</i>	
A creative learning space development toolkit: Empirical evaluation of a novel design method.....	9-245
<i>Thoring, Katja; Mueller, Roland; Badke-Schaub, Petra; Desmet, Pieter</i>	
Shifting paradigm: Towards a comprehensive understanding of quality	9-255
<i>Falk, Björn; Stylidis, Konstantinos; Wickman, Casper; Söderberg, Rikard; Schmitt, Robert</i>	
Change in peer efficacy of senior design students during a design project: a case study.....	9-265
<i>Patel, Apurva; O'Shields, Steven; Chickarello, Doug; Summers, Joshua; Turner, Cameron</i>	
Multidiscipline teams for intelligent innovation: Educating and training engineering and design students to co-creation.....	9-275
<i>Faucheu, Jenny; Boult, John; Delafosse, David</i>	
Competences for the development of smart products	9-285
<i>Herzog, Michael; Bender, Beate</i>	
Engineering design education in time-sensitive environments.....	9-295
<i>Jarrar, Majed; Anis, Hanan</i>	