16th Global Conference on Sustainable Manufacturing

- Sustainable Manufacturing for Global Circular Economy -

Conference Program
October 2-4, 2018
University of Kentucky, Lexington
United States of America
# October 2, 2018 (Tuesday)

<table>
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<tr>
<th>Time</th>
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<tr>
<td>08:00 – 08:30</td>
<td>Registration at conference site</td>
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<tr>
<td>08:30 – 09:00</td>
<td>Opening and Welcoming Speeches</td>
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<tr>
<td></td>
<td>Moderator: Fazleena Badurdeen</td>
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<td>Room: Thoroughbred Ballroom</td>
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<td></td>
<td>Eli Capulito, President – University of Kentucky (tentative)</td>
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<td>I.S. Jawahir, Chair, GCSM 2018</td>
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<td>TBA</td>
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<tr>
<td>09:00 – 10:00</td>
<td>Keynote Session</td>
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<td>Moderation: I.S. Jawahir</td>
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<td>Room: Thoroughbred Ballroom</td>
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<tr>
<td>09:00 – 09:30</td>
<td>Günther Seliger</td>
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<td></td>
<td>Technical University of Berlin, Germany</td>
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<td></td>
<td>The Challenge of Sustainable Manufacturing</td>
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<tr>
<td>09:30 – 10:00</td>
<td>Dean L. Bartles</td>
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<td>National Tooling and Machining Association, USA</td>
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<td>Using “Exponential” Technologies to Drive Manufacturing Towards a Sustainable Future</td>
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<tr>
<td>10:00 – 10:30</td>
<td>Coffee Break</td>
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<tr>
<td>10:30 – 11:30</td>
<td>Keynote Session</td>
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<td></td>
<td>Moderation: Rafi Wertheim</td>
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<td>Room: Thoroughbred Ballroom</td>
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<tr>
<td>10:30 – 11:00</td>
<td>Joost R. Duflou</td>
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<td></td>
<td>Catholic University of Leuven (KU), Belgium</td>
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<tr>
<td></td>
<td>Towards Industrial Symbiosis in Discrete Manufacturing: Opportunities in Alternative Recycling Route Identification for Industrial Waste Streams</td>
</tr>
<tr>
<td>11:00 – 11:30</td>
<td>John Davies</td>
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<td>GreenBiz, USA</td>
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<td></td>
<td>From Here to Circularity: A Model for Restorative and Regenerative Enterprise</td>
</tr>
<tr>
<td>11:30 – 13:00</td>
<td>Sessions and Industry Presentations</td>
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<tr>
<td>13:00 – 14:00</td>
<td>Lunch (Thoroughbred Ballroom)</td>
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<td>Luncheon Speaker: O. S. Ganiyusufoglu, Shenyang Machine Tool (Group) Co.</td>
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<tr>
<td></td>
<td>Global Sustainable Development Goals - An Obligation For All Of Us!</td>
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<tr>
<td>14:00 – 14:30</td>
<td>Keynote Session</td>
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<td>Moderation: Julius Schoop</td>
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<td>Room: Thoroughbred Ballroom</td>
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<tr>
<td>14:00 – 14:30</td>
<td>Dermot Brabazon</td>
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<td>Dublin City University (DCU), Ireland</td>
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<td></td>
<td>Additive Manufacturing - A Game Changer for Sustainable Manufacturing?</td>
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<tr>
<td>14:30 – 16:00</td>
<td>Sessions</td>
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<tr>
<td>16:00 – 16:30</td>
<td>Coffee Break</td>
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<tr>
<td>16:30 – 17:30</td>
<td>Panel Discussion</td>
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</table>
# Sessions and Industry Presentations

**October 2, 2018 (Tuesday), 11:30 – 13:00 (90 minutes)**

<table>
<thead>
<tr>
<th>Session 1: Sustainable Products</th>
<th>Session 2: Sustainable Manufacturing Processes</th>
<th>Session 3: Sustainable Manufacturing Systems</th>
<th>Session 4: Industry Presentations</th>
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<th>Room Thoroughbred 5</th>
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<tbody>
<tr>
<td>Jerome Kaspar, Stephan Bechtel (Saarland University, Germany), Tobias Hälele (University of Applied Sciences Saarland, Germany), Franziska Herter, Jan-Henrik Schneberger, Dirk Bährle (Saarland University, Germany), Jürgen Griebisch (University of Applied Sciences Saarland, Germany), Hans-Georg Herrmann, Michael Vielhaber (Saarland University, Germany)</td>
<td>Ashutosh Khatri, Muhammad Jahan (Miami University, USA)</td>
<td>Lena Pfeilsticker, Eduardo Calangelo (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany), Alexander Sauer (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany, University of Stuttgart, Germany)</td>
<td>Jessica Sanderson (Novelis Inc.), Jon Doyle (Lexmark International), Adam Schofer (Intel Corp.), Kevin Bell (Toyota Motor North America)</td>
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<tr>
<td>Christian Enyoghasi (University of Kentucky, USA, Institute for Sustainable Manufacturing, USA), Adam Brown, Ridvan Aydin (Institute for Sustainable Manufacturing, USA), Fazleena Badurdeen (University of Kentucky, USA, Institute for Sustainable Manufacturing, USA)</td>
<td>Sarafaadeen Azeez, Madindwa Mashinini, Esther T. Akinlabi (University of Johannesburg, South Africa)</td>
<td>Matthias Hacksteiner (Vienna University of Technology, Austria), G. Fuchs (BMW Group Plant Steyr, Austria), F. Bleicher (Vienna University of Technology, Austria)</td>
<td>Tawanda Mushiri (University of Johannesburg, South Africa), Reynolds T. Gumbo (University of Zimbabwe), Charles Mbohwa (University of Johannesburg, South Africa)</td>
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<thead>
<tr>
<th>Road Map to Sustainability of Friction Stir Welded Al-Si-Mg Joints using Bivariate Weibull Analysis (ID: 215)</th>
<th>Knowledge-based Approach to Managing Industrial Energy (ID: 165)</th>
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</thead>
<tbody>
<tr>
<td>Sarafaadeen Azeez, Esther T. Akinlabi (University of Johannesburg, South Africa)</td>
<td>Mohammed Omar (Khalifa University, UAE), Ahmad Mayyas (National Renewable Energy Laboratory, USA), Safa Al Ameri (Khalifa University, UAE)</td>
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<tr>
<td>Design for Manufacture and Assembly of an Automated Dish Washing Machine (ID: 12)</td>
<td>Tawanda Mushiri (University of Johannesburg, South Africa), Rutendo F. Solomon (University of Zimbabwe, Zimbabwe), Charles Mbohwa (University of Johannesburg, South Africa)</td>
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<tr>
<td>Performance Assessment of CaF₂ Solid Lubricant Assisted Minimum Quantity Lubrication in Turning (ID: 174)</td>
<td>Mayurkumar A Makhesana, Kaushik Patel (Nirma University, India)</td>
</tr>
<tr>
<td>Simulation-based Analysis of Energy Flexible Factories in a Regional Energy Supply System (ID: 252)</td>
<td>Stefan Roth (Fraunhofer Research Institution for Casting, Composite and Processing Technology IGCV, Germany), Markus Thimmel (Fraunhofer Institute for Applied Information Technology FIT, Germany), Jasmin Fischer (Fraunhofer Research Institution for Casting, Composite and Processing Technology IGCV, Germany), Michael Schöpf (Fraunhofer Institute for Applied Information Technology FIT, Germany), Eric Unterberger (Fraunhofer Research Institution for Casting, Composite and Processing Technology IGCV, Germany), Stefan Braunreuther (Fraunhofer Research Institution for Casting, Composite and Processing Technology IGCV, Germany), Hans Ulrich Buhl (Fraunhofer Institute for Applied Information Technology FIT, Germany), Gunther Reinhart (Fraunhofer Research Institution for Casting, Composite and Processing Technology IGCV, Germany)</td>
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<tr>
<td>A Total Life Cycle Approach for Developing Predictive Design Methodologies to Optimize Product Performance (ID: 191)</td>
<td>Buddhika M. Hapuwatte, I.S. Jawahir (University of Kentucky, USA)</td>
</tr>
<tr>
<td>Minimizing Carbon Emission with Improved Human Health in Sustainable Machining of Austenitic Stainless Steel through Multi-objective Optimization (ID: 193)</td>
<td>Alper Uysal (University of Kentucky, USA, Yildiz Technical University, Turkey), James R. Caudill, I.S. Jawahir (University of Kentucky, USA)</td>
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<tr>
<td>Dynamic Design and Management of Reconfigurable Manufacturing Systems (ID: 138)</td>
<td>Marco Bortolini (University of Bologna, Italy), Francesco Gabriele Galizia (University of Padova, Italy), Cristina Mora (University of Bologna, Italy)</td>
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**Lunch**  
13:00 – 14:00
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<td>Session Chair: Tony Elam</td>
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<tr>
<td><strong>Constructive Methods to Reduce Thermal influences on the Accuracy of Industrial Robots (ID: 25)</strong> Christian Mohnke, Sascha Reinkober, Eckart Uhlmann (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany)</td>
<td><strong>Improving Sustainability and Cost Efficiency for Spare Part Allocation Strategies by Utilisation of Additive Manufacturing Technologies (ID: 212)</strong> Karl Ott (Fraunhofer Austria Research GmbH, Austria), Heimo Pascher (Fraunhofer Austria Research GmbH, Austria), Wilfried Sihn (Fraunhofer Austria Research GmbH, Austria, Technical University of Vienna, Austria)</td>
<td><strong>Using the Sharing Economy Approach to Provide Sustainable Mobility (ID: 267)</strong> Semih Severengiz (Bochum University of Applied Sciences, Germany)</td>
<td><strong>Featured Case Study: Circular Economy- Real-World Success</strong> John Gagel (Lexmark International), Ingrid Sinclair (Sims Recycling Solutions Inc), Jean-Luc Lavergne (Lavergne Group)</td>
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<tr>
<td><strong>Development of an Electric Drive Train for Cycles as a Sustainable Means of Transportation for a Green Environment (ID: 70)</strong> Simon Chinguwa, Wilson R. Nyemba (University of Johannesburg, South Africa), Emmanuel Ngondo (University of Zimbabwe, Zimbabwe), Charles Mbohwa (University of Johannesburg, South Africa)</td>
<td><strong>Guidelines to Compare Additive and Subtractive Manufacturing Approaches under the Energy Demand Perspective (ID: 41)</strong> Giuseppe Ingaraq (University of Palermo, Italy), Paolo Priarone (Politecnico di Torino, Italy), Rosa Di Lorenzo (University of Palermo, Italy), Luca Settineri (Politecnico di Torino, Italy)</td>
<td><strong>Designing and Redesigning Products, Processes, and Systems for a Helical Economy (ID: 159)</strong> Ryan Bradley, LS Jawahir (University of Kentucky, USA)</td>
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<td><strong>Stepping Valve Actuator Algorithm for a Camless IC Engine (ID: 136)</strong> Ishmael Zibani, Rapelang Marumo (University of Botswana), Joseph Chuma (Botswana International University of Science and Technology), I. Ngebani, K. Tsamaase (University of Botswana)</td>
<td><strong>Improving the R&amp;D Process Efficiency of the Selective Laser Sintering Industry through Numerical Thermal Modeling (ID: 53)</strong> Carlo Martin Olivier, Gert Adriaan Oosthuizen (University of Stellenbosch, South Africa), Natasha Sacks (University of the Witwatersrand, South Africa)</td>
<td><strong>A Conceptual Framework to Create Shared Value in Base of the Pyramid Communities with Micro-Containerised Factories (ID: 27)</strong> Zviemurwi J. Chihambakwe, Gert Adriaan Oosthuizen, Stephen Matope, Emad H. Uheida (Stellenbosch University, South Africa)</td>
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<td>Institution(s)</td>
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<td>Conceptual Model of Life Cycle Assessment based Generic Computer Tool</td>
<td>Rajitha L. Peiris, Asela K. Kulatunga, K.B.S.N. Jinadasa</td>
<td>University of Peradeniya, Sri Lanka</td>
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<td>towards Eco-Design in Manufacturing Sector (ID: 163)</td>
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<td>Optimisation of Build Orientation to Achieve Minimum Environmental</td>
<td>Mattia Mele, Giampaolo Campana, Fabio Lenzi</td>
<td>University of Bologna, Italy, University of Bologna, Italy, Research Development Division (ARIC), Italy</td>
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<td>Impact in Stereo-lithography (ID: 97)</td>
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<td>Benchmarking the sustainable manufacturing paradigm via Automatic</td>
<td>Michele Dassisti (Polytechnic University of Bari, Italy), Filippo Chiarello (University of Pisa, Italy), Paolo C. Priarone (Politecnico di Torino, Italy), Giuseppe Ingarao (Università di Palermo, Italy), Giampaolo Campana (University of Bologna, Italy), Andrea Matta, Marcello Colledani, Nicla Frigerio (Polytechnic University of Milan, Italy), Archiemede Forcellese, Michela Simoncini (Polytechnic University of Marche, Italy)</td>
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<td>analysis and clustering of scientific literature: an Italian</td>
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<td>Technology perspective (ID: 277)</td>
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<td>Sustainable Value Creation through Remanufacturing</td>
<td>Adam Trebolow (Springfield Remanufacturing Corp (SRC))</td>
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<tr>
<td>A Study on the Role of Oil-air Mist Lubrication on a Ultrahigh-speed</td>
<td>Ramesh Kuppuswamy, Colin Richmond, Azeem Khan</td>
<td>University of Cape Town, South Africa</td>
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<td>Bio-generator (ID: 5)</td>
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<td>Sustainability of Metal Powder Additive Manufacturing (ID: 233)</td>
<td>Claes Fredriksson (University West, Sweden)</td>
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<td>Measuring Sustainable Performance in an Environment Where Every</td>
<td>John Cross (American Institute of Steel Construction)</td>
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<td>Product is Unique</td>
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<tr>
<td>Coffee Break</td>
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<td>15:30 – 16:00</td>
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**Panel Discussion**  
October 2, 2018 (Tuesday), 16:30 – 17:30 (60 minutes)

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<td>Session Chair: TBA</td>
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**Manufacturing USA: National Institutes for Manufacturing Innovation**  
Alan Taub, Chief Technology Officer, Institute for Lightweight Innovations for Tomorrow (LIFT)  
Uday Vaidya, Chief Technology Officer, Institute for Advanced Composites Manufacturing Innovation (IACMI)  
Jim Davis, Senior Advisor, Clean Energy Smart Manufacturing Innovation Institute
### October 3, 2018 (Wednesday)

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>08:00 – 08:30</td>
<td>Registration at conference site</td>
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| 08:30 – 10:00 | **Keynote Session**  
Moderation: Günter Seliger  
Room: Thoroughbred Ballroom |
| 08:30 – 09:00 | Mike Molnar  
*Advanced Manufacturing Programs, National Institute for Standards and Technology, USA*  
Manufacturing USA: Bridging the Gap to a Sustainable Future |
| 09:00 – 09:30 | Holger Kohl  
*Technical University of Berlin, Germany*  
International Case Studies for Innovative Learning Approaches by Learnstruments and MakerSpaces for Fostering Sustainable Manufacturing |
| 09:30 – 10:00 | Marwan Khraisheh  
*Qatar Research Foundation, Doha, Qatar*  
Towards Sustainable Energy: Advancing Solar PV in Harsh Desert Climates |
| 10:00 – 10:15 | Coffee Break                                                       |
| 10:15 – 13:00 | Sessions                                                            |
| 10:15 – 11:30 | Session 9: Sustainable Products  
Room Thoroughbred 5  
Session 10: Sustainable Manufacturing Processes  
Room Thoroughbred 6  
Session 11: Sustainable Manufacturing Systems  
Room Thoroughbred 7  
Session 12: Crosscutting Topics in Sustainable Manufacturing  
Room Thoroughbred 8 |
| 11:30 – 11:45 | Break / Transition Between Sessions                                |
| 11:45 – 13:00 | Session 13: Sustainable Products  
Room Thoroughbred 5  
Session 14: Sustainable Manufacturing Processes  
Room Thoroughbred 6  
Session 15: Sustainable Manufacturing Systems  
Room Thoroughbred 7  
Session 16: Sustainable Manufacturing Processes  
Room Thoroughbred 8 |
| 13:00 – 14:00 | Lunch (Thoroughbred Ballroom)  
Luncheon Speaker: James George, Ellen MacArthur Foundation  
Title: TBD |
| 14:00 – 14:30 | **Keynote Session**  
Moderation: Joost R. Duflou  
Room: Thoroughbred Ballroom |
| 14:00 – 14:30 | Rossi Setchi  
*Cardiff University, United Kingdom*  
Integrated Decision-Making for Sustainable Design and Manufacturing |
| 14:30 – 15:45 | Sessions                                                            |
| 14:30 – 15:45 | Session 17: Sustainable Manufacturing Processes  
Room Thoroughbred 5  
Session 18: Sustainable Manufacturing Processes  
Room Thoroughbred 6  
Session 19: Sustainable Manufacturing Systems  
Room Thoroughbred 7  
Session 20: Crosscutting Topics in Sustainable Manufacturing  
Room Thoroughbred 8 |
| 15:45 – 16:00 | Coffee Break                                                       |
| 16:00 – 17:15 | Sessions                                                            |
| 16:00 – 17:15 | Session 21: Sustainable Manufacturing Systems  
Room Thoroughbred 5  
Session 22: Sustainable Manufacturing Processes  
Room Thoroughbred 6  
Session 23: Sustainable Manufacturing Processes  
Room Thoroughbred 7  
Session 24: Crosscutting Topics in Sustainable Manufacturing  
Room Thoroughbred 8 |
| 17:30 – 18:30 | Bus Transfer to Kentucky Horse Park                                |
| 18:30 – 21:30 | Conference Banquet                                                  |
| 21:30 – 22:30 | Bus Transfer to Downtown                                           |
### Sessions

**October 3, 2018 (Wednesday), 10:15 – 11:30 (75 minutes)**

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<tr>
<th>Session 9: Sustainable Products</th>
<th>Session 10: Sustainable Manufacturing Processes</th>
<th>Session 11: Sustainable Materials Composites and Plastics</th>
<th>Session 12: Crosscutting Topics in Sustainable Manufacturing Industry 4.0 and Sustainable Manufacturing</th>
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<tbody>
<tr>
<td>Product Recovery, Reuse and Remanufacturing</td>
<td>Manufacturing Processes, Tools and Equipment</td>
<td>Highly Rigid Assembled Composite Structures with Continuous Fiber-Reinforced Thermoplastics for Automotive Applications</td>
<td>Identification and Structuring of Benefits and Expenses for Evaluating the Profitability of Investments in Digitalization within Production</td>
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<tr>
<td><strong>Solving the Disassembly-to-Order Problem for Components and Materials under Stochastic Yields, Limited Supply, and Quantity Discount using Linear Physical Programming (ID: 231)</strong></td>
<td>Investigation of the Solubility of Liquid CO₂ and Liquid Oil to Realize an Internal Single Channel Supply in Milling of Ti6Al4V (ID: 20)</td>
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<tr>
<td>Yuki Kinoshita, Tetsuo Yamada (The University of Electro-Communications, Japan), Surendra M. Gupta (Northeastern University, USA)</td>
<td>Thomas Bergs (RWTH Aachen University), Franci Pušavec (University of Ljubljana), Matthias Koch (RWTH Aachen University), Damir Grugurš (University of Ljubljana), Benjamin Döbbeler, Fritz Klocke (RWTH Aachen University)</td>
<td>Highly Rigid Assembled Composite Structures with Continuous Fiber-Reinforced Thermoplastics for Automotive Applications (ID: 250)</td>
<td>Identification and Structuring of Benefits and Expenses for Evaluating the Profitability of Investments in Digitalization within Production (ID: 22)</td>
</tr>
<tr>
<td>Thomas Guidat, Aleksandra Wewer, Holger Kohl, Günther Seliger (Technische Universität Berlin, Germany)</td>
<td>Nurul Hayati Abdul Halim (Universiti Kebangsaan Malaysia, Malaysia, Universiti Teknologi MARA, Malaysia), Che Hassan Che Haron, Jarahah Abdul Ghani, Muammar Faq Azhar (Universiti Kebangsaan Malaysia, Malaysia)</td>
<td>Florian Brillowski, Christoph Greb, Thomas Gries (RWTH Aachen University, Germany)</td>
<td>Melissa Demartini (University of Genoa, Italy), Steve Evans (University of Cambridge, UK), Flavio Tonelli (University of Genoa, Italy)</td>
</tr>
<tr>
<td>Jan Lehr, Marian Schlüter (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany), Jörg Krüger (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany, Technische Universität Berlin, Germany)</td>
<td>Muammar Faq Azhar, Che Hassan Che Haron, Jarahah A. Ghan (Universiti Kebangsaan Malaysia, Malaysia), Nurul Hayati Abdul Halim (Universiti Kebangsaan Malaysia, Malaysia, Universiti Teknologi MARA, Malaysia)</td>
<td>Hakan Kazan, Saeed Farahani, Srikanth Pilla (Clemson University, USA)</td>
<td>Christopher Ehrmann (Karlsruhe Institute of Technology KIT, Germany, Tongji University, China), Zhao-hui Liu (Tongji University, China, Jilin University, China, Jilin University, China), Weimin Zhang (Tongji University, China), Jürgen Fleischer (Karlsruhe Institute of Technology KIT, Germany)</td>
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<tr>
<td>Title</td>
<td>Authors</td>
<td>Institution</td>
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<tr>
<td>Application of Fuzzy Logic in Selection of Remanufacturing Technology</td>
<td>John Mbogo Kafuku (University of Dar es Salaam, Tanzania), Muhamad Zameri Mat Saman, Shari’i Mohd Yusof (Universiti Teknologi Malaysia (UTM)), Mohd Fahrul Hassan (Universiti Tun Hussein Onn Malaysia)</td>
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<tr>
<td>Multi-criteria Decision-making for the Life Cycle of Sustainable High Pressure Die Casting Products</td>
<td>Emanuele Pagone, Konstantinos Salonitis, Mark Jolly (Cranfield University, UK)</td>
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<tr>
<td>Energy- and Ecologically-oriented Selection of Plastic Materials</td>
<td>Heiko Dunkelberg, Tim Weiß, F. Mazurek (University of Kassel, Germany)</td>
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<td>Development of an Intelligent Tool Condition Monitoring System to Identify Manufacturing Tradeoffs and Optimal Machining Conditions</td>
<td>Wo Jae Lee, Gamini P. Mendis, John W. Sutherland (Purdue University, USA)</td>
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### Sessions
October 3, 2018 (Wednesday), 11:45 – 13:00 (75 minutes)

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<tr>
<td>Darlene Steward, Ahmad Mayyas, Margaret Mann (National Renewable Energy Laboratory, USA)</td>
<td>Uwe Götte (Technische Universität Chemnitz, Germany), Paolo Peças (Universidade de Lisboa, Portugal), Fanny Richter (Technische Universität Chemnitz, Germany)</td>
<td>Lothar Kroll (Chemnitz University of Technology, Germany, Opole University of Technology, Poland), Stefan Hoyer (Chemnitz University of Technology, Germany)</td>
<td>Carmen Höne, Max Weeber (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany), Fritz Braeuer (Karlsruhe Institute of Technology KIT, Germany), Alexander Sauer (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany, University of Stuttgart, Germany)</td>
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<td>Achim Kampker, Johannes Trieb, Ansgar Hollah, Christoph Lienemann (RWTH Aachen University, Germany)</td>
<td>Prateek Saxena, Giuliano Bissacco (Technical University of Denmark, Denmark)</td>
<td>Alperen Can, Gregor Thiele, Jörg Krüger, Jessica Fisch, Carsten Klemm (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany)</td>
<td>Enrique Meza-García, Anja Rautenstrauch, Verena Kräusel, Dirk Landgrebe (Technische Universität Chemnitz, Germany)</td>
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<td>Alice Matenga, Friyeti Murenza, Givemore Kanyemba, Samson Mhlianga (National University of Science and Technology, Zimbabwe)</td>
<td>Francesco Gabriele Galizia (University of Padova, Italy), Waguhi ElMaraghy, Hoda ElMaraghy (University of Windsor, Canada), Marco Bortolini, Cristina Mora (University of Bologna, Italy)</td>
<td>John Mbogo Kafuku (University of Dar es Salaam, Tanzania)</td>
<td>Wilson R. Nyemba (University of Johannesburg, South Africa), Zvikombororo B. Kapumha (University of Zimbabwe, Zimbabwe), Tawanda Mushiri, Charles Mbohwa (University of Johannesburg, South Africa)</td>
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<tr>
<td>ID: 99</td>
<td>Evaluation of Environmental Impact and Benefits for Remanufactured Construction Equipment Parts Using Life Cycle Assessment</td>
<td>Yong-Sung Jun, Hong-Yoon Kang, Hyun-Jung Jo, Chun-Youl Baek, Young-Chun Kim (Center for Resources Information &amp; Management (KiTECH), Korea)</td>
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<tr>
<td>ID: 116</td>
<td>Effects of Cooling Lubricant on the Thermal Regime in the Working Space of Machine Tools</td>
<td>Michael Bräunig, Joachim Regel (Technische Universität Chemnitz, Germany), Janine Glänzel (Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany), Matthias Putz (Technische Universität Chemnitz, Germany, Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany)</td>
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<tr>
<td>ID: 66</td>
<td>A Holistic Perspective for the Manufacturing Sustainability</td>
<td>Ibrahim Garbie (Helwan University, Egypt)</td>
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<tr>
<td>ID: 175</td>
<td>Design Rules for Additive Manufacturing – Understanding the Fundamental Thermal Phenomena to Reduce Scrap</td>
<td>M. Reza Yavari, Kevin D. Cole, Prahalada K. Rao (University of Nebraska-Lincoln, USA)</td>
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**Lunch**  
13:00 – 14:00
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<tr>
<td>Resource Utilization and Waste Reduction</td>
<td>Simon Chinguwa, Wilson R. Nyemba (University of Johannesburg, South Africa), Kudzai Boora (University of Zimbabwe, Zimbabwe), Charles Mbohwa (University of Johannesburg, South Africa)</td>
<td>Robert Joopen, Sebastian von Enzberg, Arno Kühn (Fraunhofer-Institut für Entwurfstechnik Mechatronik IEM), Roman Dumitrescu (University of Paderborn)</td>
<td>Achim Kampker, Kai Kreiskoeth,arius Schumacher (RWTH Aachen University, Germany)</td>
<td>Jan Menn, Mustafa Severengiz, Andrea Lorenz, Günther Seliger (Technische Universität Berlin, Germany)</td>
</tr>
<tr>
<td>Energy and Resource Efficiency</td>
<td>Bupe Mwanza (Cavendish University, Zambia, University of Johannesburg, South Africa), Charles Mbohwa, Arnes Telukdarie, Chucks Medoh (University of Johannesburg, South Africa)</td>
<td>Gregor Thiele, Oliver Heimann (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany), Knut Grabowski (ÖKOTEC Energiemanagement GmbH, Germany), Jörg Krüger (Fraunhofer Institute for Production Systems and Design Technology IPK, Technische Universität Berlin, Germany)</td>
<td>Nicole Oertwig, Patrick Gering, Thomas Knothe (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany), Sven O. Rimmelspacher (Pickert&amp;Partner GmbH, Germany)</td>
<td>Bartlomiej Gladysz (Warsaw University of Technology, Poland), Marcello Urgo (Politecnico di Milano, Italy), Tim Stock (Technische Universität Berlin, Germany), Cecilia Haskins (Norwegian University of Science and Technology (NTNU), Norway), Felix Sieckmann (Technische Universität Berlin, Germany), Elzbieta Jarzebowska (Warsaw University of Technology, Poland), Holger Kohl (Technische Universität Berlin, Germany), Jan Ola Strandhagen (Norwegian University of Science and Technology (NTNU), Norway), Tulio Tollio (Politecnico di Milano, Italy)</td>
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<tr>
<td>Production Planning, Scheduling and Control</td>
<td>Giulia Baruffaldi (University of Padua, Italy), Riccardo Accorsi, Luca Volpe, Riccardo Manzini (University of Bologna, Italy)</td>
<td>Christoph T. Hoffmann (Bayreuth University, Germany), Julian Prá (Friedrich-Alexander-University Erlangen-Nürnberg, Germany), Thomas Hans-Joachim Uhlemann (Bayreuth University, Germany), Jörg Franke (Friedrich-Alexander-University Erlangen-Nürnberg, Germany)</td>
<td>Wiseman Muchaendepi, Charles Mbohwa (University of Johannesburg, South Africa), Chimbuli Hamandishe, James Kanyepe (Chinhoyi University of Technology, Zimbabwe)</td>
<td>Minna Lanz, Hasse Nylund, Timo Lehtonen, Tero Juuti (Tampere University of Technology, Finland), Kaisu Rättyä (University of Tampere, Finland)</td>
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Coffee Break
15:45 – 16:00
## Sessions

**October 3, 2018 (Wednesday), 16:00 – 17:15 (75 minutes)**

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<td>Room Thoroughbred 7</td>
<td>Nicolas Kassel, Asela Kulatunga (University of Peradeniya, Sri Lanka), N.C. Kassel (University of Bremen, Germany)</td>
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<td>Session Chair: TBA</td>
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<tr>
<td>Analysis on Sustainable Supply Chain for Circular Economy (ID: 131)</td>
<td>Experimental Methods to Study Environmental Sustainability of Silicon-based Lithium Ion Battery Manufacturing (ID: 254)</td>
<td>Influence of Constitutive Models on Finite Element Simulation of Chip Formation in Orthogonal Cutting of Ti-6Al-4V Alloy (ID: 192)</td>
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<tr>
<td>Manavalan Ethirajan, Jayakrishna Kandasamy (Vellore Institute of Technology (VIT), India)</td>
<td>Fenfen Wang (Case Western Reserve University, USA), Lulu Ma (University of Wisconsin-Milwaukee, USA), Chris Yuan (Case Western Reserve University, USA)</td>
<td>Guang Chen, Lianpeng Lu, Zhihong Ke, Xuda Qin, Chengzur Ren (Tianjin University, China)</td>
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<tr>
<td>Alperen Bal (Yalova University, Turkey), Sule Itir Satoglu (Istanbul Technical University, Turkey)</td>
<td>Ahmad Mayyas, Margaret Mann (National Renewable Energy Laboratory, USA)</td>
<td>Elita Amrina, Ardy Yulianto, Insannul Kamil (Andalas University, Indonesia)</td>
<td>Loice Gudukeya, Charles Mbohwa (University of Johannesburg, South Africa), Paul T. Mativenga (The University of Manchester, UK)</td>
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<tr>
<td>The Use of Data Envelopment Analysis in Evaluating Pareto Optimal Solutions of the Sustainable Supply Chain Models (ID: 87)</td>
<td>Evaluating the Usability of Bio Coal from Sugar Cane Bagasse as a Solid Fuel (ID: 64)</td>
<td>Signal-based non-Intrusive Load Decomposition (ID: 44)</td>
<td>Road to Sustainable Manufacturing: Why Households are not Participating in Recycling Programs in Ndola, Zambia? (ID: 50)</td>
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<tr>
<td>(ID: 87)</td>
<td>Musaida M. Manyuchi (University of Johannesburg, South Africa, Manicaland State University of Applied Sciences, Zimbabwe), Charles Mbohwa (University of Johannesburg, South Africa), Edison Muzenda (University of Johannesburg, South Africa, Botswana International University of Science and Technology, Botswana)</td>
<td>Tim Weiß, Heiko Dunkelberg, Jan-Peter Seevers (University of Kassel, Germany)</td>
<td>Bupe Mwanza (Cavendish University, Zambia, University of Johannesburg, South Africa), Charles Mbohwa, Arnesh Telukdarie, Chucks Medoh (University of Johannesburg, South Africa)</td>
</tr>
<tr>
<td>Challenges Faced by the Mining Sector in Implementing Sustainable Supply Chain Management in Zimbabwe (ID: 268)</td>
<td>Perfect Repair Constraints in Manufacturing Firms – A Case Study (ID: 78)</td>
<td>Material and Process Selection Sustainability Aspects (ID: 166)</td>
<td>Innovation Catalysts for Industrial Waste Challenges: Sri Lankan and Thai Cases (ID: 106)</td>
</tr>
<tr>
<td>Wiseman W. Muchaendepi, Charles Mbohwa (University of Johannesburg, South Africa), James Kanyeye (Chinhoyi University of Technology, Zimbabwe), Michael Mutingi (University of Johannesburg, South Africa)</td>
<td>Peter Muganyi (University of Johannesburg, South Africa)</td>
<td>Mohammed Omar (Khalifa University of Science and Technology, UAE), Ala Qattawi (University of California, USA), Numan Saeed (Khalifa University of Science and Technology, UAE)</td>
<td>Curie Park (University of Cambridge, UK), Kallaya Tantiyaswasdikul (Thammasat University, Thailand), Steve Evans (University of Cambridge, UK), Pusit Lertwattanaruk (Thammasat University, Thailand)</td>
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<td>Inventory Sharing in Supply Chains with Scarce Resource: Decisions, Benefit and Optimization (ID: 24)</td>
<td>[Presentation only]</td>
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<tr>
<td>Ziteng Wang (Northern Illinois University, USA)</td>
<td>Perfect Repair Constraints in Manufacturing Firms – A Case Study (ID: 78)</td>
<td>Material and Process Selection Sustainability Aspects (ID: 166)</td>
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<tr>
<td>[Presentation only]</td>
<td>Perfect Repair Constraints in Manufacturing Firms – A Case Study (ID: 78)</td>
<td>Mohammed Omar (Khalifa University of Science and Technology, UAE), Ala Qattawi (University of California, USA), Numan Saeed (Khalifa University of Science and Technology, UAE)</td>
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### Other Activities

- **Bus Transfer to Kentucky Horse Park**
  - 17:30 – 18:30

- **Conference Banquet**
  - 18:30 – 21:30

- **Bus Transfer to Lexington Downtown**
  - 21:30 – 22:30
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<tr>
<th>Time</th>
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<th>Location</th>
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<tbody>
<tr>
<td>08:00 – 08:30</td>
<td>Registration at conference site</td>
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<tr>
<td>08:30 – 10:00</td>
<td>Keynote Session</td>
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<td>Moderation: Holger Kohl</td>
<td>Thoroughbred Ballroom</td>
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<td>Room: Thoroughbred Ballroom</td>
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<tr>
<td>08:30 – 09:00</td>
<td>Rafi Wertheim</td>
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<td></td>
<td>Fraunhofer IWU, Germany</td>
<td>Converging of Biologicalisation, Digitalization, Sustainability and Future Manufacturing (ID: 270)</td>
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<tr>
<td>09:00 – 09:30</td>
<td>Wilfried Sihn</td>
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<td></td>
<td>Vienna University of Technology, Austria</td>
<td>Digitized, Optimized, Ecologized? Can Digitization Promote Sustainable Manufacturing?</td>
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<tr>
<td>09:30 – 10:00</td>
<td>Mohamed El-Mansori</td>
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<td></td>
<td>Arts et Métiers Paris Tech, France</td>
<td>Smart Manufacturing of Natural Fiber Composites</td>
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<tr>
<td>10:00 – 10:30</td>
<td>Coffee Break</td>
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<tr>
<td>10:30 – 12:00</td>
<td>Sessions</td>
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<tr>
<td></td>
<td>Session 25: Crosscutting Topics in Sustainable Manufacturing</td>
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<td>Session 26: Sustainable Manufacturing Processes</td>
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<td></td>
<td>Session 27: Sustainable Manufacturing Processes</td>
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<td>Session 28: Sustainable Manufacturing Processes</td>
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<tr>
<td>12:00 – 13:00</td>
<td>Lunch</td>
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<td>13:00 – 14:15</td>
<td>Session 29: Sustainable Products</td>
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<td></td>
<td>Session 30: Sustainable Manufacturing Processes</td>
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<td></td>
<td>Session 31: Sustainable Manufacturing Processes</td>
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<td></td>
<td>Session 32: Crosscutting Topics in Sustainable Manufacturing</td>
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<tr>
<td>14:15 – 14:30</td>
<td>Break/Transition Between Sessions</td>
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<tr>
<td>14:30 – 15:45</td>
<td>Session 33: Sustainable Manufacturing Processes</td>
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<td></td>
<td>Session 34: Sustainable Manufacturing Processes</td>
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<td></td>
<td>Session 35: Student Competition Presentations</td>
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<tr>
<td>15:45</td>
<td>Farewell and end of the 15th Global Conference on Sustainable Manufacturing</td>
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### Sessions

**October 4, 2018 (Thursday), 10:30 – 12:00 (90 minutes)**

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<tr>
<td>Pedro Gimenez (Loughborough University, UK)</td>
<td>Eckart Uhligmann, Hendrik Riemer (Technische Universität Berlin, Germany), Sehoon An, Maik Fröhlich (Leibniz Institute for Plasma Science and Technology (INP), Germany), Hanno Paschke (Fraunhofer Institute for Surface Engineering and Thin Films (IST), Germany), Mirjana Petersen (Albrecht + Schumacher Oberflächentechnik GmbH, Germany)</td>
<td>Bakary Diarra, Adamu Murtala Zungeru, Samikannu Ravi, Joseph Chuma, Babakomo Basutili (Botswana International University of Science and Technology, Botswana)</td>
<td>Vi Kie Sog (The Australian National University, Australia), Jef Peeters (Katholieke Universiteit Leuven, Belgium), Paul Compston (The Australian National University, Australia), Matthew Doolan (The Australian National University, Australia), Joost Duflou (Katholieke Universiteit Leuven, Belgium)</td>
</tr>
<tr>
<td>M. Vermeulen, Gert Adriaan Oosthuizen (Stellenbosch University, South Africa)</td>
<td>Eckart Uhligmann, Tobias Holznagel, L. Prasol (Technische Universität Berlin, Germany)</td>
<td>Ana Esther Bonilla Hernández (GKN Aerospace Engine Systems AB, Sweden, University West, Sweden)</td>
<td>Manish Kumar, Monto Mani (Indian Institute of Science, India)</td>
</tr>
<tr>
<td>Barbara S. Linke, Destiny R. Garcia, Akshay Kamath, Ian C. Garretson (University of California Davis, USA)</td>
<td>Eren Kaya, Irfan Kaya, Adnan Kaya</td>
<td>Ana Esther Bonilla Hernández (GKN Aerospace Engine Systems AB, Sweden, University West, Sweden), Tao Lu (University of Kentucky, USA), Tomas Beno, Claes Fredrikkson (University West, Sweden), I.S. Jawahir (University of Kentucky, USA)</td>
<td>Michele Dassi (Politecnico di Bari, Italy), Concetta Semeraro (MASTER s.r.l., Italy), Michela Chimenti (INRES LAB s.c.a.r.l., Italy)</td>
</tr>
<tr>
<td>Erik Steinbügel, Mila M. Galeitze (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany), Holger Kohl (Technische Universität Berlin, Germany)</td>
<td>Florian Morczinek (Chemnitz University of Technology, Germany), Matthias Putz (Fraunhofer Institute for Machine Tools and Forming Technology, Germany), Martin Dix (Chemnitz University of Technology, Germany)</td>
<td>Obafemi O. Olatunji, Stephen A. Akinlabi (University of Johannesburg, South Africa), Oluseyi Ajayi (Covenant University, Nigeria), Madushele Nkosinathi (University of Johannesburg, South Africa)</td>
<td>Wen Shen (Wuhan University of Technology, China), Dan Hu (Iowa State University, USA), Elif Elcin Gunay (Iowa State University, USA), Sakarya University, Turkey), Güli E. Oktan Kremer (Iowa State University, USA)</td>
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<tr>
<td>Title</td>
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<tr>
<td>Energy Demand Reduction of Aluminum Alloys Recycling through Friction Stir Extrusion Processes Implementation (ID: 57)</td>
<td>Giuseppe Ingarao, Dario Baffari (University of Palermo, Italy), Ellen Bracquene (Katholieke Universiteit Leuven, Belgium), Livan Fratini (University of Palermo, Italy), Joost Duflou (Katholieke Universiteit Leuven, Belgium)</td>
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<tr>
<td>Exploring the Relationships Between Product Innovation Radicality and Extensity of Flexibility in Sustainable Manufacturing System: How Flexibility affects the Performance of Most Innovative Factories in the USA (ID: 32)</td>
<td>Selma Oliveira (Fluminense University, Brazil)</td>
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<td>October 4, 2018 (Thursday), 13:00 – 14:15 (75 minutes)</td>
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<tr>
<td><strong>Session 29:</strong> Sustainable Products</td>
<td><strong>Session 30:</strong> Sustainable Manufacturing Processes</td>
<td><strong>Session 31:</strong> Sustainable Manufacturing Processes</td>
<td><strong>Session 32:</strong> Crosscutting Topics in Sustainable Manufacturing Education and Workforce Development</td>
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<tr>
<td>Product (Re)Design for Circular Economy</td>
<td>Cutting Technologies</td>
<td>Manufacturing Processes, Tools and Equipment</td>
<td>Analysis of Industrial Engineering Qualifications for the Job Market (ID: 274)</td>
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<td>Session Chair: TBA</td>
<td>Severengiz, Günther Seliger (Technische Universität Berlin, Germany)</td>
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<td>Friedrich Halstenberg, Rainer Stark (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany)</td>
<td>Ahmed Abu Hanieh, Ahmad Albalasie (Birzeit University, Palestine)</td>
<td>Sriman Manoharan, Dustin Scott Harper, Kari R. Haapala (Oregon State University, USA)</td>
<td>Wilson R. Nyemba (University of Johannesburg, South Africa), Keith F. Carter (University of Leicester, UK), Charles Mbohwa, Simon Chinguwa (University of Johannesburg, South Africa)</td>
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<tr>
<td>A Simulation Model of Consumer Take-Back Decisions Regarding Product Design (ID: 151)</td>
<td>An Investigation of Buzz Saw Blade Cutting Forces Depending on Tool Geometry for Cutting Frozen Wood (ID: 52)</td>
<td>About the Use of Mineral and Vegetable Oils to Improve the Sustainability of Steel Quenching (ID: 96)</td>
<td>Promoting STEM Education through Sustainable Manufacturing: Case Study of Photovoltaic Toys (ID: 222)</td>
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<tr>
<td>Josiah J. Greef (Iowa State University, USA), Elif Elcin Gunay (Iowa State University, USA), Sakarya University, Turkey, Gul E. Okuden Kremer (Iowa State University, USA)</td>
<td>Christoph Schmidt (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany), Hans-Henrik Westermann (Bayreuth University, Germany), Rolf Steinhilper (Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany, Bayreuth University, Germany)</td>
<td>Fabio Lenzi, Giampaolo Campana, Antonio Lopatriello Mattia Mele (University of Bologna, Italy), Andrea Zanotti (Proterm S.p.A, Italy)</td>
<td>Juliana Machuve, Edward Mkenda (University of Dar es Salaam, Tanzania)</td>
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<tr>
<td>Effectiveness of Product Recovery Systems (ID: 227)</td>
<td>Effects of Surface Texture Parameters of Cutting Tools on Friction Conditions at Tool-Chip Interface during Dry Machining of AISI 1045 Steel (ID: 211)</td>
<td>A Thermal FEA Modeling of Multiple Machining Processes for Practical Machining Process Optimization (ID: 143)</td>
<td>Non-linear Autoregressive Neural Network (NARNET) with SSA Filtering for an University Energy Consumption Forecast (ID: 217)</td>
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<tr>
<td>Matthew Doolan, Brendan Moloney, Vi Kie Soo (The Australian National University, Australia)</td>
<td>Sagar Dhage, Anshu Dhar Jayal, Prabir Sarkar (Indian Institute of Technology Ropar, India)</td>
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<td>Paul A데deji, Stephen Akinlabi (University of Johannesburg, South Africa), Oluseyi Ajayi (Covenant University, Nigeria), Nkosinathi Madushe (University of Johannesburg, South Africa)</td>
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<tr>
<td>Sustainable Product Strategy using SWOT and AHP Methods (ID: 83)</td>
<td>Enhancing Accuracy and Productivity of Super Precision Turning Machining Centers (ID: 249)</td>
<td>Microstructural Effect of Laser Cladded Ti + TiB2 on Steel Rail (ID: 164)</td>
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<td>Mohd Fahrul Hassan, Ng Wee Chen, Md Fauzi Ahmad (Universiti Tun Hussein Onn Malaysia, Malaysia), Muhammad Zameri Mat Saman (Universiti Teknologi Malaysia, Malaysia), Norhayati Zakuan, Falah Abu (Universiti Teknologi MARA, Malaysia)</td>
<td>E. Kushnir (Hardinge, USA), R. Karadavy (Applied Automation Technologies, USA), W. Clark (Hardinge, USA), A. C. Affer, A. Naga (Applied Automation Technologies, USA)</td>
<td>Victor I. Aladesanmi, Samuel Fatoba, Esther T. Akinlabi (University of Johannesburg, South Africa)</td>
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<td>Session 33: Sustainable Manufacturing Processes</td>
<td>Session 34: Sustainable Manufacturing Processes</td>
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<td>Session 36: Crosscutting Topics in Sustainable Manufacturing Industry 4.0 and Sustainable Manufacturing</td>
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<td>Energy and Resource Efficiency</td>
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<td>Belt Grinding of Cast Iron without Cooling Lubricant (ID: 23) Eckart Uhlmann, Michael Bültner (Technische Universität Berlin, Germany)</td>
<td>Continuous Trajectory Planning for Welding of Complex Joints Using Bezier Curve (ID: 162) John Ogbenmhe, Khumbulani Mpofo, Nkghotho Tiale (Tshwane University of Technology, South Africa)</td>
<td>Development of a software tool to enable companies to detect potentials in remanufacturing Suraj Mani Chaurasiya (Technische Universität Berlin, Germany)</td>
<td>Induction Motor Condition Monitoring for Sustainable Manufacturing (ID: 220) Jianjing Zhang, Peng Wang, Robert X. Gao (Case Western Reserve University, USA), Chuang Sun, Ruqiang Yan (Xi’an Jiaotong University, China)</td>
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<td>Interaction of Tool and Workpiece in Ultrasonic-assisted Grinding of High Performance Ceramics (ID: 55) Eckart Uhlmann, Joachim Bruckhoff (Technische Universität Berlin, Germany)</td>
<td>A Fracture Mechanics Approach to Wire Design for Reduced Damage in Diamond Wire Sawn Silicon Wafers (ID: 276) Arkadeep Kumar, Shreyes N. Meltkote (Georgia Institute of Technology, USA)</td>
<td>Structured Approach to Evaluating and Improving Product Sustainability: A Case Study with a 3D Printer Darren Tosh, Peter Hong, Christian Enyoghasi, Brett Crosby, David Omotaya (University of Kentucky, USA)</td>
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<td>Sustainable Cooling and Lubrication Strategies in Machining Processes: A Comparative Study (ID: 141) Hussien Hegab, Hossam Kishawy (University of Ontario Institute of Technology, Canada), B. Darras (American University of Sharjah, UAE)</td>
<td>Drivers and Barriers for the Adoption of Eco-Design Practices in Pulp and Paper Industry: A Case Study of Finland (ID: 150) Shqipe Buzuku, Tuomo Kässi (Lappeenranta University of Technology, Finland)</td>
<td>Methodology for the Sustainability-related Evaluation of Human-Robot Collaborations (ID: 92) Uwe Götzte, M. Schildt (Chemnitz University of Technology, Germany), Barbara Mikus (Leipzig University of Applied Sciences (HTWK), Germany)</td>
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Farewell and end of the 16th Global Conference on Sustainable Manufacturing 15:45