



**15<sup>th</sup> Global Conference on Sustainable Manufacturing**  
**- Decoupling Growth from Resource Use -**

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**Programme**  
25<sup>th</sup> - 27<sup>th</sup> September 2017  
Technion – Israel Institute of Technology, Haifa  
Israel

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## September 25<sup>th</sup> 2017, Monday

<b>08:00 – 08:30</b> Registration at conference site				
<b>08:30 – 09:00</b> Opening and Welcoming Speeches Auditorium 6 - Floor 0 - Kahn Building				
08:30 – 09:00	<b>Moshe Shpitalni, Host &amp; Chairman</b> <b>Günther Seliger, Chairman</b> <b>Peretz Lavie, Technion President</b> <b>Yona Yahav, Mayor of Haifa</b> <b>Stef Wertheimer, Honorary Chairman</b> <b>Sinaia Netanyahu, Chief Scientist, Ministry of Environmental Protection</b>			
<b>09:00 – 10:30</b> Moderation: Günther Seliger Auditorium 6 - Floor 0 - Kahn Building				
09:00 – 09:30	<b>Reimund Neugebauer</b> <i>Fraunhofer President</i>		Industrie 4.0 - From a Perspective of Applied Research	
09:30 – 10:00	<b>Alon Wolf</b> <i>Technion</i>		Technological Challenges in Medical Robotics for Surgery and Patient Specific Treatment	
10:00 – 10:30	<b>Shahin Rahimifard</b> <i>Loughborough University</i>		Net Positive Manufacturing : A Restoring, Self-healing and Regenerative Approach to Future Industrial Development	
<b>10:30 – 10:45</b> Announcement of GCSM 2018				
<b>10:45 – 11:00</b> Coffee Break				
<b>11:00 – 13:00</b> Sessions and Workshops				
11:00 – 13:00	<b>Session 1: Forming</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 2: Additive Manufacturing</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Workshop 1: Technion Student Activities</b> Room No. 217 - Floor 2 - Kahn Building	<b>Workshop 2: Environment, Industry and Science</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>13:00 – 14:00</b> Lunch				
<b>14:00 – 15:30</b> Sessions and Workshop				
14:00 – 15:30	<b>Session 3: Planning</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 4: Business Models</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 5: Design</b> Room No. 217 - Floor 2 - Kahn Building	<b>Workshop 3: Learning for the Fourth Industrial Revolution: a Virtual Factory Learnstrument</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>15:30 – 16:00</b> Coffee Break				
<b>16:00 – 17:00</b> Sessions				
16:00 – 17:00	<b>Session 6: Machine Tools</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 7: Robotics</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 8: Technology</b> Room No. 217 - Floor 2 - Kahn Building	
<b>17:00 – 19:00</b> Trip to Baha'i and German Colony				

**Sessions and Workshops**  
September 25<sup>th</sup>, Monday, 11:00 – 13:00

Session 1: Forming	Session 2: Additive Manufacturing	Workshop 1: Technion Student Activities	Workshop 2: Environment, Industry and Science
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Erman Tekkaya ( <i>Technische Universität Dortmund</i> )	Session Chair: Paulo Bártolo ( <i>University of Manchester</i> )	Moderator: Anath Fischer and Ronit Schneur ( <i>Technion</i> )	Moderator: Dr. Sinaia Netanyahu ( <i>Ministry of Environmental Protection</i> )
<p><b>Evaluation of Manufacturing Processes for the Production of Graded Ultrafine Grained Materials</b> (ID: 160)</p> <p>Dirk Landgrebe, René Selbmann (<i>Fraunhofer IWU</i>), Anja Schmidt, Uwe Götze, Markus Bergmann (<i>Technische Universität Chemnitz</i>)</p>	<p><b>Influence of Process Parameters on Residual Stress in Related Distortions Selective Laser Melting</b> (ID: 113)</p> <p>Lameck Mugwagwa, Dimitar Dimitrov, Stephen Matope (<i>Stellenbosch University</i>), Igor Yadroitsev (<i>Central University of Technology Freistaat</i>)</p>	<p>At the fourth year of mechanical engineering undergraduate studies, the students perform an annual project in different ME fields.</p> <p>In this session we will present a number of projects performed by mechanical engineering students in the fields of bio-mechanics, additive manufacturing, bio-robotics and CAD. The projects include state-of-art literature review, examination of advanced methods, implementation and validation.</p> <p>Furthermore, we will present two thesis performed by graduate students as part of their MSc studies, also in these areas.</p>	<p>This workshop on environment, technology and science shares a selection of government actions in these fields.</p> <p>The workshop briefly introduces the state of the environment in Israel and the progress made by the Ministry of Environmental Protection in recent years in regulating environmental issues related to achievements, and also progress made by the industry. In particular, we will demonstrate the implementation of Integrated Environmental Licensing and Emission Reporting as adopted from the EU Regulation. We will demonstrate a significant measure led by the Ministry on a Haifa Bay National Plan in order to reduce pollution and environmental risks. This will be followed by presenting the Ministry's effort in going beyond regulation as part of government action in promoting voluntary sustainable manufacturing. We then show an innovative dimension related to a cross-ministerial effort in searching for alternative fuels for transportation as part of a National Program dedicated to this issue. The Ministry of Science and Technology will introduce its mission in promoting science and innovation in various fields, this time emphasizing the areas of engineering and</p>
<p><b>Modified Cross-Wedge Rolling to Create Hollow Shafts</b> (ID: 120)</p> <p>Juergen Steger, Dirk Landgrebe, Uwe Böhmichen, Markus Bergmann (<i>Fraunhofer IWU</i>)</p>	<p><b>Prospects of Additive Manufacturing of Rare-Earth and Non-Rare-Earth Permanent Magnets</b> (ID: 190)</p> <p>V. Popov, G. Muller (<i>Technion</i>), A. Koptvug (<i>Mid Sweden University</i>), K. Skokov, I. Radulov (<i>Technische Universität Darmstadt</i>)</p>		
<p><b>A Die Profile for Maximum Efficiency in Strip Drawing of Anisotropic Materials</b> (ID: 105)</p> <p>Sergei Alexandrov (<i>IPMech RAS</i>), Alexander Pirumov (<i>Moscow Technological University</i>)</p>	<p><b>Laser Metal Deposition Technique: Sustainability and Environmental Impact</b> (ID: 150)</p> <p>Esther T. Akinlabi (<i>University of Johannesburg</i>), Kamardeen O. Abdulrahman, Rasheedat M. Mahamood (<i>University of Ilorin</i>)</p>		
<p><b>Optimization of the Casting Technology and Sustainable Manufacture of 100mm Grinding Balls for the Mining Sector in Zimbabwe</b> (ID: 40)</p> <p>Wilson R. Nyemba, Charles Mbohwa (<i>University of Johannesburg</i>), Ranganai T. Moyo (<i>University of Zimbabwe</i>)</p>	<p><b>3D Printing of Biodegradable Parts Using Renewable Bio-Based Materials</b> (ID: 27)</p> <p>Henning Zeidler (<i>Technische Universität Freiberg</i>), Diana Klemm, Falko Böttger-Hiller (<i>Beckmann-Institut für Technologieentwicklung</i>), Sebastian Fritsch (<i>Technische Universität Chemnitz</i>), Marie Joo Le Guen (<i>Scion New Zealand</i>), Sarat Singamneni (<i>AUT University</i>)</p>		

<p><b>Laser Beam Forming: A Sustainable Manufacturing Process</b> (ID: 186)</p> <p><u>Stephen Akinlabi</u>, Esther Akinlabi (<i>University of Johannesburg</i>)</p>	<p><b>Effect Of Hot Isostatic Pressure Treatment on The Electron-Beam Melted Ti-6Al-4V Specimens</b> (ID: 4)</p> <p><u>Vladimir Popov</u>, Alexander Katz-Demyanetz, Andrey Garkun, Gary Muller, Evgeny Strokin, Haim Rosenson (<i>Technion</i>)</p>		robotics.
<p><b>Development of a Model for Predicting Cycle Time in Hot Stamping</b> (ID: 168)</p> <p><u>Rumbidzai Muvunzi</u>, D.M. Dimitrov, S. Matope, T.M. Harms (<i>Stellenbosch University</i>)</p>	<p><b>Weight Reduction of 3D-Printed Cylindrical and Toroidal Pressure Vessels through Shape Modification</b> (ID: 170)</p> <p><u>Ehud Kroll</u>, Eldad Buchris (<i>ORT Braude College</i>)</p>		
<p><b>Lunch</b> 13:00 – 14:00</p>			

**Sessions and Workshop**  
**September 25th, Monday, 14:00 – 15:30**

Session 3: Planning	Session 4: Business Models	Session 5: Design	Workshop 3: Learning for the Fourth Industrial Revolution: a Virtual Factory Learnstrument
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Dimitar Dimitrov ( <i>Stellenbosch University</i> )	Session Chair: Anandi Iyer ( <i>Fraunhofer India</i> )	Session Chair: Barbara Cimatti ( <i>University of Bologna</i> )	Moderators: Henrique Rozenfeld, Omar Chaim ( <i>Universidade de Sao Paulo</i> ), Bernd Muschard ( <i>Technische Universität Berlin</i> )
<p><b>A Road Map for Applied Data Sciences Supporting Sustainability in Advanced Manufacturing: The Information Quality Dimensions</b> (ID 183)</p> <p>Ron S. Kenett (<i>KPA Ltd; University of Turin</i>), <u>Avigdor Zonnenshain</u>, Gilead Fortuna (<i>Samuel Neaman Institute</i>)</p>	<p><b>Product, Service, and Business Model Innovation: A Discussion</b> (ID: 49)</p> <p>Martin Geissdoerfer, Doroteya Vladimirova, Steve Evans (<i>University of Cambridge</i>)</p>	<p><b>Topology and Shape Optimization with Explicit Geometric Constraints Using a Spline-Based Representation and a Fixed Grid</b> (ID: 156)</p> <p><u>Yosef M. Yoely</u>, Oded Amir, Iddo Hanniel (<i>Technion</i>)</p>	<p>The innovations towards an Industry 4.0 are having a disruptive influence on the manufacturing industry by establishing an interplay of smart factories, smart products and smart services embedded in an internet of things and services also called industrial internet. Meeting the future needs for learning and in-work training requires the development of new learning conductive technologies, materials and methods.</p> <p>Through the usage of a new developed Learnstrument and guided discussions, this workshop aims to clarify some of the significant changes that follow the transition towards Industry 4.0 in an interactive manner. Participants will be challenged in a virtual environment where they have to solve industrial issues using tools and practices of Industry 4.0. After each challenge, a short discussion will follow regarding the applied approaches and their relation to the fourth industrial revolution. To close the workshop, a discussion on the learning method itself will be held.</p>
<p><b>Methodology for Implementing Innovative Ventures in Emerging Countries – Case Study of the Starting Phase of a Chinese-Israeli Automotive Green-Field Company</b> (ID: 157)</p> <p><u>Dieter O. Schacher</u></p>	<p><b>Knowledge Management Framework for Complaint Knowledge Transfer to Product Development</b> (ID: 131)</p> <p><u>Thomas Hellebrandt</u>, Ina Heine, Robert Schmitt (<i>RWTH Aachen</i>)</p>	<p><b>Smart Materials for Smart Production – A Cross-Disciplinary Innovation Network in the Field of Smart Materials</b> (ID: 163)</p> <p><u>Welf-Guntram Drossel</u>, <u>Holger Kunze</u>, André Bucht (<i>Fraunhofer IWP</i>), Frithjof Meinel (<i>University of Art and Design Halle</i>)</p>	
<p><b>Project Flywheel - Taking the Next Step towards Practical Industrial Innovation</b> (ID: 142)</p> <p><u>Ruth Dagan</u> (<i>Herzog Fox &amp; Neeman Law Office</i>)</p>	<p><b>How Sustainable Business Models and Firm Capabilities Co-Evolve to Shape Industrial Symbiosis Development: A Validated Theoretical Framework</b> (ID: 158)</p> <p>Hanmin Huang, Yongjiang Shi (<i>University of Cambridge</i>)</p>	<p><b>Fast and Iterative Prototyping for Injection Molding – A Case Study of Rapidly Prototyping</b> (ID: 152)</p> <p><u>Carlo Kriesi</u>, Øystein Bjelland, Martin Steinert (<i>NTNU Trondheim</i>)</p>	
<p><b>On The Track of Human Errors - Procedure and Results of an Innovative Assembly Planning Method</b> (ID: 2)</p> <p>Robert Refflinghaus, <u>Christian Kern</u> (<i>University of Kassel</i>)</p>	<p><b>Challenges and Opportunities in Adopting and Implementing Sustainability Plans in Engineering, Mining and Processing Companies in Zimbabwe</b> (ID: 65)</p> <p>Wilson R. Nyemba, Charles Mbohwa (<i>University of Johannesburg</i>)</p>	<p><b>Modeling and Mechanical Analysis of Biodegradable Bone Scaffolds</b> (ID: 148)</p> <p>Ziv Aharoni, Shahar Halevy, R. Schneor, A. Fischer (<i>Technion</i>)</p>	

**Coffee Break**  
15:30 – 16:00

**Sessions**  
September 25<sup>th</sup>, Monday, 16:00 – 17:00

Session 6: Machine Tool	Session 7: Robotics	Session 8: Technology
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building
Session Chair: Martin Dix ( <i>Technische Universität Chemnitz</i> )	Session Chair: Shraga Shoval ( <i>Technion</i> )	Session Chair: Giampaolo Campana ( <i>University of Bologna</i> )
<p><b>Evaluation of Thermo-Energetic Behaviour for Demand-Oriented Operating of Machine Tool Cooling Systems</b> (ID: 76)</p> <p><u>Joachim Regel</u>, Du Xu, Michael Bräunig, Volker Wittstock (<i>Technische Universität Chemnitz</i>), Matthias Putz (<i>Fraunhofer IWU</i>)</p>	<p><b>Optimizing Step Climbing by Two Connected Wheeled Inverted Pendulum Robots</b> (ID: 144)</p> <p>Avi Weiss, <u>Uri Ben Hanan</u>, Eli Fadida (<i>ORT Braude College</i>)</p>	<p><b>Automatic Regeneration of Cemented Carbide Tools for a Resource Efficient Tool Production</b> (ID: 134)</p> <p>Berend Denkena, Marc-André Dittrich, Yanwei Liu, <u>Mirko Theuer</u> (<i>Leibniz Universität Hannover</i>)</p>
<p><b>Reconfigurable Machine Tool: CNC Machine for Milling, Grinding and Polishing</b> (ID: 98)</p> <p>Yair Shneor (<i>Center for Advanced Manufacturing Technology, Rotem Ind. Ltd.</i>)</p>	<p><b>Jumping Efficiency of Small Creatures And its Applicability in Robotics</b> (ID: 147)</p> <p><u>Uri Ben Hanan</u>, Avi Weiss, Valentin Zaitsev (<i>ORT Braude College</i>)</p>	<p><b>Cryogenic Machining through the Spindle and Tool for Improved Machining Process Performance and Sustainability: Pt. I, System Design</b> (ID: 174)</p> <p>Tao Lu, Ravikumar Kudaravalli, <u>George Georgiou</u> (<i>SME Tech Center Michigan</i>)</p>
<p><b>Virtual Verification of 5-Axis Machine Tools Based on Workpiece Accuracy Analysis: Software Tool Instead of Expensive Machining Tests</b> (ID: 114)</p> <p>Yair Shneor (<i>Center for Advanced Manufacturing Technology, Rotem Ind. Ltd.</i>), Vladimir Chapsky, Amir Shapiro (<i>Ben Gurion University of the Negev</i>)</p>	<p><b>A Method for Energetic Comparison of 6-Axis-Industrial-Robots And its Further Scope for Resource Efficient Plant Design</b> (ID: 103)</p> <p><u>Mathias Findeisen</u>, Robert Schaffrath, Marcel Todtermuschke, Matthias Putz (<i>Fraunhofer IWU</i>)</p>	<p><b>Cryogenic Machining through the Spindle and Tool for Improved Machining Process Performance and Sustainability: Pt. II, Sustainability Performance Study</b> (ID: 175)</p> <p>Tao Lu, Ravikumar Kudaravalli, George Georgiou (<i>SME Tech Center Michigan</i>)</p>
<p><b>Trip to Baha'i and German Colony</b> 17:00 – 19:00</p>		

## September 26<sup>th</sup> 2017, Tuesday

<b>08:00 – 08:30</b>	<b>Registration at conference site</b>		
<b>08:30 – 10:30</b>	<b>Moderation: Rafi Wertheim</b> Auditorium 6 - Floor 0 - Kahn Building		
08:30 – 09:00	<b>Erman Tekkaya</b> <i>Technische Universität Dortmund</i>	International Networking in Manufacturing Research and Education	
09:00 – 09:30	<b>Matthias Putz</b> <i>Technische Universität Chemnitz, Fraunhofer IWU</i>	Resilient Production - The Prerequisite for Optimum Resource Exploitation in Smart Factories	
09:30 – 10:00	<b>Fengzhou Fang</b> <i>Tianjin University</i>	Towards Nanomanufacturing	
10:00 – 10:30	<b>Holger Kohl</b> <i>Technische Universität Berlin, Fraunhofer IPK</i>	Perspectives of International Engineering Education	
<b>10:30 – 11:00</b>	<b>Coffee Break</b>		
<b>11:00 – 13:00</b>	<b>Sessions and Workshop</b>		
11:00 – 13:00	<b>Session 9: Assessment</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 10: Life Cycle</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Workshop 4: Student Presentations on Learnstruments and Learning Factories</b> Room No. 217 - Floor 2 - Kahn Building
<b>13:00 – 14:00</b>	<b>Lunch</b>		
<b>14:00 – 15:45</b>	<b>Sessions</b>		
14:00 – 15:45	<b>Session 11: Maintenance, Repair and Overhaul</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 12: Energy Efficiency</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 13: Education</b> Room No. 217 - Floor 2 - Kahn Building
			<b>Session 14: Assessment</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>15:45 – 16:00</b>	<b>Coffee Break</b>		
<b>16:00 – 17:00</b>	<b>Sessions</b>		
16:00 – 17:00	<b>Session 15: Circular Economy</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 16: Process</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 17: Production System</b> Room No. 217 - Floor 2 - Kahn Building
			<b>Session 18: Cutting</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>17:00 – 17:45</b>	<b>Bus Transfer to Dinner</b>		
<b>17:45 – 22:30</b>	<b>Joint Dinner in Caesarea</b>		
<b>22:30 – 23:00</b>	<b>Bus Transfer to Haifa</b>		

**Sessions and Workshop**  
September 26<sup>th</sup>, Tuesday, 11:00 – 13:00

Session 9: Assessment	Session 10: Life Cycle	Workshop 4: Student Presentations on Learnstruments and Learning Factories
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building
Session Chair: Avigdor Zonnenshain ( <i>Shmuel Neeman Institute</i> )	Session Chair: Kai Lindow ( <i>Fraunhofer IPK</i> )	Moderators: Jan Philipp Menn, Bernd Muschard, Felix Sieckmann ( <i>Technische Universität Berlin</i> )
<p><b>A Multidimensional Assessment and Selection Methodology: Optimized Decision-making of Joining Technologies in Automobile Body Development</b> (ID: 53)</p> <p>Saphir Choudry, Dirk Landgrebe (<i>Technische Universität Chemnitz</i>), Steffen Müller, Uwe Alber (<i>AUDI AG</i>), Frank Riedel (<i>Fraunhofer IWU</i>)</p>	<p><b>Reuse Scenarios of Tires Textile Fibers: An Environmental Evaluation</b> (ID: 66)</p> <p><u>Daniele L. Landi</u>, Marco Marconi, Ivan Meo, Michele Germani (<i>Università Politecnica delle Marche</i>)</p>	<p>Each semester about 120 TU-Berlin students take the course Project Assembly technology and Factory Planning (PMF). The students work for four months in interdisciplinary teams of 3 to 6 students on actual research topics, guided by a research engineer. Out of these student groups seven students have been selected to present their findings to the topics of Learnstruments and Learning Factories at the GCSM to foster the participation of the academic youth.</p> <p>Learnstruments are objects which automatically demonstrate their functionality to the learner. They use existing and new information and communication technology (ICT), aim at increasing the learning and teaching productivity, provide adequate learning goals to the user and support the user in achieving the learning goals</p> <p>Learning Factories are learning environments that resemble value chains with realistic industrial processes, products and technologies. Learning takes places predominately through experiential and problem-based learning. Due to a high degree of realism, the acquired knowledge can be transferred more easily to the industrial practice.</p>
<p><b>CO2-based Assessment for Sustainable Production Planning in the Metal Processing Industry</b> (ID: 17)</p> <p><u>Richard Müller</u>, Marc Loster, Rebekka Volk, Frank Schultmann (<i>Karlsruhe Institute of Technology</i>)</p>	<p><b>Process Integration Concept for Waste Reduction Among Manufacturing Planning, Modularization and Validation</b> (ID: 110)</p> <p>Tetsuo Yamada, Shota Hasegawa, Yuki Kinoshita, Shuho Yamada (<i>The University of Electro-Communications Tokyo</i>), Masato Inoue (<i>Meiji University</i>), Christoph Rosebrock, Stefan Bracke (<i>Universität Wuppertal</i>)</p>	
<p><b>Dynamic Energy LCA-Based Assessment Approach to Evaluate Energy Intensity and Related Impact for the Biogas CHP Plant as the Basis of the Environmental View of Sustainability</b> (ID: 62)</p> <p><u>Aldona Kluczek</u> (<i>Warsaw University of Technology</i>)</p>	<p><b>Study on Life-Cycle Thinking in Industrial Practice</b> (ID: 192)</p> <p><u>Kai Lindow</u> (<i>Fraunhofer IPK</i>), Andrea Kaluza, Rainer Stark (<i>Technische Universität Berlin</i>)</p>	
<p><b>Life Cycle Rating – An Approach to Support the Decision-Making Process of Manufacturing Systems</b> (ID: 91)</p> <p><u>Andreas Müller</u>, Frank Mantwill (<i>Helmut-Schmidt-Universität</i>), Martin Bornschlegl (<i>TH Ingolstadt</i>)</p>	<p><b>Feasibility Study and Development of a Sustainable Solar Thermal Power Plant Through Utilization of Mine Wastelands</b> (ID: 41)</p> <p>Wilson R. Nyemba, <u>Simon Chinguwa</u>, Charles Mbohwa, Prominent Munanga (<i>University of Johannesburg</i>)</p>	
<p><b>Social Sustainability in Technologically-supported Product Realisation Process</b> (ID: 173)</p> <p><u>Oladele O. Owodunni</u> (<i>University of Greenwich</i>)</p>		
<p><b>Investigating Life-Cycle Responsibility of Manufacturing Companies and Challenges of Sustainable Use of Marine Mineral Resources</b> (ID: 191)</p> <p><u>Andrea Kaluza</u>, Rainer Stark (<i>Technische Universität Berlin</i>), Kai Lindow (<i>Fraunhofer IPK</i>)</p>		

**Lunch**  
13:00 – 14:00



**Sessions**  
September 26<sup>th</sup>, Tuesday, 14:00 – 15:45

Session 11: Maintenance, Repair and Overhaul	Session 12: Energy Efficiency	Session 13: Education	Session 14: Assessment
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Ömer Sahin Ganiyusufoglu ( <i>Shenyang Machine Tool Group Ltd., Co. (SYMG)</i> )	Session Chair: Diana Khripko ( <i>Blubberies GmbH</i> )	Session Chair: Oladele O. Owodunni ( <i>University of Greenwich</i> )	Session Chair: Uri Ben Hanan ( <i>ORT Braude College</i> )
<b>Productivity or Sustainability? Is this the Question?</b> (ID: 193)  <u>Ömer Sahin Ganiyusufoglu</u> ( <i>Shenyang Machine Tool Group Ltd., Co.</i> )	<b>Energy Saving by Manufacturing Technology</b> (ID: 124)  <u>Erman Tekkaya</u> ( <i>Technische Universität Dortmund</i> )	<b>Integration of Mechatronics to Shape Industrial Engineering Curricula for Sustainable Manufacturing</b> (ID: 177)  <u>Pınar Bilge</u> ( <i>Technische Universität Berlin</i> )	<b>Target-Oriented Analysis of Resource Consumptions in Manufacturing Process Chains</b> (ID: 184)  <u>A. Demmer</u> , <u>N. Klingbeil</u> , <u>F. Klocke</u> , <u>T. Vollmer</u> , <u>R. Schmitt</u> ( <i>Fraunhofer IPT</i> ), <u>M. Putz</u> ( <i>Fraunhofer IWU</i> )
<b>Structural Repair Using Cold Spray Technology for Enhanced Sustainability of High Value Assets</b> (ID: 14)  <u>Christian A. Widener</u> ( <i>VRC Metal Systems</i> ), <u>Ozan C. Ozdemir</u> , <u>Michael Carter</u> ( <i>South Dakota School of Mines and Technology</i> )	<b>Control Unit for a Coreless Stator for use with SI Engine Stepping Valve</b> (ID: 109)  <u>Ishmael B. Zibani</u> , <u>Rapelang Marumo</u> , <u>Joseph Chuma</u> , <u>I. Ngebanid</u> , <u>K. Tsamaase</u> ( <i>University of Botswana</i> )	<b>Influence of Gaming Elements on Examination in Sustainable Factory Planning</b> (ID: 178)  <u>Mustafa Severengiz</u> , <u>Ina Roeder</u> , <u>Günther Seliger</u> ( <i>Technische Universität Berlin</i> )	<b>The Regional and Social Impact of Energy Flexible Factories</b> (ID: 71)  <u>Eric Unterberger</u> , <u>Fabian Keller</u> , <u>Peter Simon</u> , <u>Gunther Reinhart</u> ( <i>Fraunhofer IGCV</i> ), <u>Hans Ulrich Buhl</u> , <u>Lukas Häfner</u> , <u>Robert Keller</u> , <u>Michael Schöpf</u> ( <i>Fraunhofer FIT</i> ), <u>Steffi Ober</u> , <u>Caroline Paulick-Thiel</u> ( <i>Civil Society Platform Research Transition</i> )
<b>Condition Based Monitoring of Boiler Parameters in a Thermal Power Station (Case of Anonymous Company)</b> (ID: 6)  <u>Tawanda Mushiri</u> , <u>Charles Mbohwa</u> ( <i>University of Johannesburg</i> ), <u>Tichaona Kennedy Mhazo</u> ( <i>University of Zimbabwe</i> )	<b>Increasing Energy Efficiency in Turning of Aerospace Materials with High-Pressure Coolant Supply</b> (ID: 112)  <u>Tolga Cayli</u> , <u>Fritz Klocke</u> , <u>Benjamin Döbbeler</u> ( <i>RWTH Aachen</i> )	<b>Exploring Gamification to Support Manufacturing Education on Industry 4.0 as an Enabler for Innovation and Sustainability</b> (ID: 97)  <u>Esdras Paravizo</u> , <u>Daniel Braatz</u> ( <i>Universidade Federal de São Carlos</i> ), <u>Omar C. Chaim</u> , <u>Henrique Rozenfeld</u> ( <i>Universidade de São Paulo</i> ), <u>Bernd Muschard</u> ( <i>Technische Universität Berlin</i> )	<b>Specifying Technology and Rebound in the IPAT Identity</b> (ID: 99)  <u>Christopher L. Magee</u> ( <i>MIT Institute of Data</i> ), <u>Tessaleno Devezas</u> ( <i>Universidade Atlântica</i> )
<b>New Age Advanced Smart Water Pipe Systems Using Textile Reinforced Concrete</b> (ID: 8)  <u>Till Quadflieg</u> , <u>Goezdem Dittel</u> , <u>Thomas Gries</u> ( <i>RWTH Aachen</i> ), <u>Yiska Goldfeld</u> ( <i>Technion</i> )	<b>Hybrid Simulation-Based Optimization of Discrete Parts Manufacturing to Increase Energy Efficiency and Productivity</b> (ID: 38)  <u>Thomas Sobottka</u> , <u>Felix Kamhuber</u> , <u>Wilfried Sihh</u> ( <i>Technische Universität Wien</i> ; <i>Fraunhofer Austria</i> ), <u>Matthias Rössler</u> ( <i>dwh GmbH</i> )	<b>Insertion of Sustainability Performance Indicators in an Industry 4.0 Virtual Learning Environment</b> (ID: 69)  <u>Omar C. Chaim</u> , <u>Edson Cazarini</u> , <u>Henrique Rozenfeld</u> ( <i>University of São Paulo</i> ), <u>Bernd Muschard</u> ( <i>Technische Universität Berlin</i> )	<b>A Method to Estimate the Total VOC Emission of Furniture Products</b> (ID: 33)  <u>Roberto Menghi</u> , <u>Silvia Ceccacci</u> , <u>Alessandra Papetti</u> , <u>Marco Marconi</u> , <u>Michele Germani</u> ( <i>Università Politecnica delle Marche</i> )

<p><b>Vision-Based Identification Service for Remanufacturing Sorting (ID: 129)</b></p> <p>Marian Schlüter, Carsten Niebuhr, Jan Leer, Jörg Krüger (<i>Technische Universität Berlin</i>)</p>	<p><b>Energy and Material Efficiency Metrics in Foundries (ID: 51)</b></p> <p>Emanuele Pagone, <u>Konstantinos Salonitis</u>, Mark Jolly (<i>Cranfield University</i>)</p>	<p><b>First Proof of Concept for Language Independent Learnstruments in Special Machinery (ID: 25)</b></p> <p><u>Jan P. Menn</u>, Günther Seliger (<i>Technische Universität Berlin</i>), Carsten Ulbrich (<i>MAN Diesel &amp; Turbo SE</i>)</p>	<p><b>The Assessment Methods of The Level of Countries Environmental Safety (ID: 24)</b></p> <p>Lyudmila Serga, Vladimir V. Glinskiy, Mariya Khvan, <u>Kirill Zaykova</u> (<i>Novosibirsk State University</i>)</p>
<p><b>Coffee Break</b> 15:45 – 16:00</p>			

**Sessions**  
September 26<sup>th</sup>, Tuesday, 16:00 – 17:00

Session 15: Circular Economy	Session 16: Process	Session 17: Production System	Session 18: Cutting
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Pinar Bilge ( <i>Technische Universität Berlin</i> )	Session Chair: Konstantinos Salonitis ( <i>Cranfield University</i> )	Session Chair: Axel Demmer ( <i>Fraunhofer IPT</i> )	Session Chair: Yair Shneor ( <i>Rotem Industries Ltd. D.N. Arava</i> )
<p><b>An Approach to Favor Industrial Symbiosis: The Case of Waste Electrical and Electronic Equipment (ID: 72)</b></p> <p>Marco Marconi, Fabio Gregori, Michele Germani, Alessandra Papetti (<i>Università Politecnica delle Marche</i>), Claudio Favi (<i>Università degli Studi di Parma</i>)</p>	<p><b>Experimental Investigation into Optimal Processing Conditions for Abrasive Slurry Jet Polishing of Mold Steel (ID: 36)</b></p> <p>Chengyong Wang, Rongjuan Wang (<i>Guangdong University of Technology</i>)</p>	<p><b>Equivalence Assessment Method for the Resource Efficiency of Equipment, Technologies and Production Systems (ID: 107)</b></p> <p>Alexander Pavlovitch Kuznetsov (<i>Moscow State University of Technology</i>), Hans-Joachim Koriath, Tino Langer (<i>Fraunhofer IWU</i>), A.V. Kalyashina (<i>Kazan National Research Technical University</i>)</p>	<p><b>Diamond Wire Sawing of Solar Silicon Wafers: Sustainable Manufacturing Alternative to Loose Abrasive Slurry Sawing (ID: 164)</b></p> <p>Shreyes Melkote, Arkadeep Kumar (<i>Georgia Institute of Technology</i>)</p>
<p><b>Unlocking Economic Value and Sustainable Furniture Manufacturing through Recycling and Reuse of Sawdust (ID: 39)</b></p> <p>Wilson R. Nyemba, Charles Mbohwa (<i>University of Johannesburg</i>), Allen Hondo, Luxmore Madiye (<i>University of Zimbabwe</i>)</p>	<p><b>Wear Reduction on Cutting Inserts By Additional Internal Cooling of the Cutting Edge (ID: 11)</b></p> <p>Friedrich Bleicher, Manuel Reiter (<i>Technische Universität Wien</i>)</p>	<p><b>A Probabilistic Approach to the Stochastic Job-Shop Scheduling Problem (ID: 16)</b></p> <p>Shraga Shoval (<i>Ariel University</i>), Mahmoud Efatmaneshnik (<i>UNSW–Canberra</i>)</p>	<p><b>Potentials for the Optimization of Sawing Processes Using the Example of Band Sawing Machines (ID: 155)</b></p> <p>Daniel Albrecht, Hans-Christian Moehring (<i>University of Stuttgart</i>)</p>
	<p><b>The Effect of Coating Thickness and Substrate Roughness on Tool Wear During Turning (ID: 79)</b></p> <p>Izhak Etsion (<i>Technion</i>), M. Bar-Hen (<i>Iscar Ltd.</i>)</p>	<p><b>Total Quality Management in Indian Manufacturing SMEs (ID: 165)</b></p> <p>Sudhir Yadav, Saumyaranjan Sahoo (<i>Pandit Deendayal Petroleum University</i>)</p>	<p><b>Evaluation of the Influence of Different Clamping Chuck Types on Energy Consumption, Tool Wear and Surface Qualities in Milling Operations (ID: 12)</b></p> <p>Benjamin Thorenz, Hans Westermann, Markus Kafara, Marina Nützel (<i>Universität Bayreuth</i>), Rolf Steinhilper (<i>Fraunhofer IPA</i>)</p>
<b>Bus Transfer to Dinner</b> 17:00 – 17:45			
<b>Joint Dinner</b> 17:45 – 22:30			
<b>Bus Transfer to Haifa</b> 22:30 – 23:30			

## September 27<sup>th</sup>, 2017 Wednesday

<b>08:00 – 08:30</b>	<b>Registration at conference site</b>			
<b>08:30 – 10:00</b>	<b>Moderation: Anath Fischer</b> Auditorium 6 - Floor 0 - Kahn Building			
08:30 – 09:00	<b>Yoram Koren</b> <i>University of Michigan</i>	Sustainable Living Factories for Next Generation Manufacturing		
09:00 – 09:30	<b>Paolo Bártolo</b> <i>University of Manchester</i>	Additive Manufacturing Technologies: Present and Future		
09:30 – 10:00	<b>Leonid Tartakovsky</b> <i>Technion – Israel Institute of Technology</i>	High-Pressure Thermo-Chemical Recuperation – A Way Toward Sustainable Propulsion Systems		
<b>10:00 – 10:15</b>	<b>Coffee Break</b>			
<b>10:15 – 11:15</b>	<b>Sessions</b>			
10:15 – 11:15	<b>Session 19: New Technologies</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 20: Entrepreneurial Initiative</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 21: Nanotechnology</b> Room No. 217 - Floor 2 - Kahn Building	<b>Gordon Session 22: Additive Manufacturing</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>11:15 – 11:30</b>	<b>Coffee Break</b>			
<b>11:30 – 13:00</b>	<b>Sessions</b>			
11:30 – 13:00	<b>Session 23: Industrie 4.0</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 24: Energy Efficiency</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 25: Design</b> Room No. 217 - Floor 2 - Kahn Building	<b>Session 26: Additive Manufacturing</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>13:00 – 14:00</b>	<b>Lunch</b>			
<b>14:00 – 16:00</b>	<b>Sessions and Workshop</b>			
14:00 – 16:00	<b>Session 27: Assessment</b> Room 442 - Floor 4 – Lady Davis Building	<b>Session 28: Strategy</b> Auditorium 1 - Floor 0 - Kahn Building	<b>Session 29: Design</b> Room No. 217 - Floor 2 - Kahn Building	<b>Workshop 5: Sustainability in Additive Manufacturing</b> Room No. 250 - Floor 2 - Lady Davis Building
<b>16:00 – 17:30</b>	<b>Technion Laboratory Visit and Coffee Break</b>			
<b>17:30</b>	<b>Farewell and end of the 15<sup>th</sup> Global Conference on Sustainable Manufacturing</b>			

## Sessions

September 27<sup>th</sup> 2017, Wednesday, 10:15 – 11:15

Session 19: New Technologies	Session 20: Entrepreneurial Initiative	Session 21: Nanotechnology	Gordon Session 22: Additive Manufacturing
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Shreyes Melkote ( <i>University of Arkansas</i> )	Session Chair: Giampaolo Campana ( <i>University of Bologna</i> )	Session Chair: Fengzhou Fang ( <i>Tianjin University</i> )	Session Chair: Anath Fischer ( <i>Technion</i> )
<p><b>High Precision Machining of Hybrid Layer Composites by Abrasive Waterjet Cutting (ID: 101)</b></p> <p>Matthias Putz (<i>Technische Universität Chemnitz; Fraunhofer IWU</i>), Axel Rennau, <u>Martin Dix</u> (<i>Fraunhofer IWU</i>)</p>	<p><b>Development of Low Cost Solid-Liquid Separation Prototype Used for Recovering Nutrients from Wastewater in the Gaza strip (ID: 188)</b></p> <p>Samir Alnahhal (<i>Palestinian Environmental Friends Association</i>), Samir Afifi (<i>Islamic University of Gaza</i>), Günther Seliger (<i>Technische Universität Berlin</i>)</p>	<p><b>Carbon Nanotube Grease and Sustainable Manufacturing (ID: 162)</b></p> <p><u>Haiping Hong</u>, Greg Christensen, Christian Widener (<i>South Dakota School of Mines and Technology</i>)</p>	<p><b>Influence of Binder Quantity on Dimensional Accuracy and Resilience in 3D-Printing (ID: 37)</b></p> <p><u>Markus Kafara</u> (<i>Universität Bayreuth</i>), Jan Kemnitzer, Hans Westermann, Rolf Steinhilper (<i>Fraunhofer IPA</i>)</p>
<p><b>Ultrasonic-based Detection of Air-leakage for the Unclosed Components of Large Aircraft (ID: 34)</b></p> <p>Wei Zhao, Pengfei Ma, Ning He, Liang Li, Yinfei Yang (<i>Nanjing University of Aeronautics and Astronautics</i>)</p>	<p><b>A Local Learning Market to Explore Innovation Platforms (ID: 119)</b></p> <p><u>Kirsten E. Van Fossen</u>, Jeremie Morfin, Steve Evans (<i>University of Cambridge</i>)</p>	<p><b>A Targeted Functional Value Based Nanoclay/PA 12 Composite Material Development for Selective Laser Sintering Process (ID: 78)</b></p> <p><u>Sunil Tiwari</u>, Santosh Bobade (<i>Jaypee University of Engineering &amp; Technology</i>), Sarang Pande (<i>Marwadi Education Foundations Group of Institutions</i>), Santosh Kumar (<i>Indian Institute of Technology</i>)</p>	<p><b>Build Time Estimation Models for Thermal Extrusion Additive Manufacturing Processes (ID: 139)</b></p> <p>George Komineas, Panagis Foteinopoulos, <u>Alexios Papacharalampopoulos</u>, Panagiotis Stavropoulos (<i>University of Patras</i>)</p>
<p><b>Production Technology of Cores for Hybrid Laminates Containing Rubber Powder from Scrap Tyres (ID: 187)</b></p> <p>L. Kroll (<i>Opole University of Technology; Technische Universität Chemnitz</i>), S. Hoyer, M. Klaerner (<i>Technische Universität Chemnitz</i>)</p>	<p><b>Levers Influencing Sustainable Waste Recovery at Households Level: A Review (ID: 45)</b></p> <p><u>Bupe Getrude Mwanza</u>, Charles Mbohwa, Arnesh Telukdarie (<i>University of Johannesburg</i>)</p>		<p><b>Concept of Sustainable Data for a Selective Laser Melting Machine (ID: 67)</b></p> <p><u>Rodrigo Pastl Pontes</u>, Abdelhakim Laghmouchi, André Bergmann (<i>Fraunhofer IPK</i>), Eckart Uhlmann (<i>Technische Universität Berlin; Fraunhofer IPK</i>)</p>
<p><b>Coffee Break</b> 11:15 – 11:30</p>			

**Sessions**  
September 27<sup>th</sup>, Wednesday, 11:30 – 13:00

Session 23: Industrie 4.0	Session 24: Energy Efficiency	Session 25: Design	Session 26: Additive Manufacturing
Auditorium 1 - Floor 0 - Kahn Building	Room 442 - Floor 4 – Lady Davis Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Henrique Rozenfeld ( <i>Universidade de São Paulo</i> )	Session Chair: Leonid Tartakovsky ( <i>Technion</i> )	Session Chair: Tetsuo Yamada ( <i>University of Electro-Communications</i> )	Session Chair: Reuven Katz ( <i>Technion</i> )
<b>Moving From Industry 2.0 to Industry 4.0: A Case Study from India on Leapfrogging in Smart Manufacturing</b> (ID: 143)  <u>Anandi Iyer</u> ( <i>Fraunhofer Office India</i> )	<b>Methodology and Model for Predicting Energy Consumption in Manufacturing at Multiple Scales</b> (ID: 172)  <u>Jan Reimann</u> , Marko Friedemann, Ken Wenzel, Matthias Putz ( <i>Fraunhofer IWU</i> )	<b>Sustainable Aspects Regarding a Multi-Criteria &amp; Cross-Component Prediction of Property Change Potentials Within the Pre-Development Phase of Technical Product Systems</b> (ID: 30)  <u>Jerome Kaspar</u> , Philip Meiser, Michael Vielhaber ( <i>Universität Saarland</i> ), Tobias Luedeke ( <i>csi Entwicklungstechnik GmbH</i> )	<b>Path Planning for Filling 3D Printed Parts Utilizing Hilbert Curves</b> (ID: 140)  <u>Alexios Papacharalampopoulos</u> , Panos Stavropoulos, Harry Bikas ( <i>University of Patras</i> )
<b>Manufacturing in the Fourth Industrial Revolution: A Positive Prospect in Sustainable Manufacturing</b> (ID: 159)  Núbia G P Carvalho, Omar C. Chaim, Edson Cazarini, Mateus Gerolamo ( <i>University of São Paulo</i> )	<b>Energy Efficiency and Demand Side Management: A Case Study of a Holistic Energy Concept in Polymer Processing</b> (ID: 42)  Diana Khripko ( <i>Blueberries GmbH</i> ), Heiko Dunkelberg, Jens Hesselbach ( <i>Universität Kassel</i> ), D. L. Summerbell ( <i>University of Cambridge</i> )	<b>A Computer-Aided Mold Design for Transfer Molding Process in Semiconductor Packaging Industry</b> (ID: 185)  <u>M. A. Karim</u> , M. R. Alam, M. Rahman ( <i>Queensland University of Technology</i> )	<b>Manufacturing of Carbide Tools by Selective Laser Melting</b> (ID: 189)  André Bergmann ( <i>Fraunhofer IPK</i> ), Robert Bolz ( <i>Technische Universität Berlin</i> ), Eckart Uhlmann ( <i>Fraunhofer IPK; Technische Universität Berlin</i> )
<b>Decentralized Intelligence: The Key for an Energy Efficient and Sustainable Intralogistics</b> (ID: 102)  <u>Michael Scholz</u> , Xu Zhang, Sven Kreitlein, Jörg Franke ( <i>Friedrich-Alexander-Universität Erlangen-Nürnberg</i> )	<b>A ‘System’ Integration for Energy Recovery Within Data Centres Using Combined Cooling and Power Technology</b> (ID: 73)  Yang Luo, John Andresen, Mercedes Maroto-Valer ( <i>Heriot-Watt University</i> ), Henry Clarke ( <i>Dearman Engine Company</i> ), Matthew Rajendra ( <i>Submersify Corporation</i> )	<b>The Design of Portable Automobile Refrigerators Powered by Exhaust Heat Using Thermoelectric Refrigeration</b> (ID: 7)  Tawanda Mushiri ( <i>University of Johannesburg</i> ), Christopher Musora, Simon Chinguwa ( <i>University of Zimbabwe</i> )	<b>Cryogenic Machining as a Sustainable Process to Finish Additive Manufactured Ti6Al4V for Biomedical Applications</b> (ID: 117)  <u>Stefania Bruschi</u> , <u>Stefano Sartori</u> , <u>Andrea Ghiotti</u> , <u>Paolo Bariani</u>
<b>Strategies for the Recovery and Recycling of Plastic Solid Waste (PSW): A Focus on Plastic Manufacturing Companies</b> (ID: 46)  <u>Bupe Getrude Mwanza</u> , Charles Mbohwa, Arnesh Telukdarie ( <i>University of Johannesburg</i> )	<b>Energy Efficiency of State-of-the-Art Grinding Processes</b> (ID: 43)  <u>Matthias Hacksteiner</u> , Harald Peherstorfer, Friedrich Bleicher ( <i>Fraunhofer IFT</i> )	<b>Virtual Prototyping Technologies Enabling Resource-Efficient and Human-Centered Product Development</b> (ID: 77)  Christoph Allmacher, <u>Manuel Dudczig</u> , Philipp Klimant ( <i>Technische Universität Chemnitz</i> ), Matthias Putz ( <i>Fraunhofer IWU; Technische Universität Chemnitz</i> )	<b>3D Printing Towards Advanced Manufacturing Technologies in Israel from Academia to Industry – Review</b> (ID: 194)  <u>Ehud Galun</u> ( <i>Materials Division, DDR&amp;D IMOD</i> )

**Lunch**  
13:00 – 14:00

**Sessions and Workshop**  
September 27<sup>th</sup>, Wednesday, 14:00 – 16:00

Session 27: Assessment	Session 28: Strategy	Session 29: Design	Workshop 5: Sustainability in Additive Manufacturing
Room 442 - Floor 4 – Lady Davis Building	Auditorium 1 - Floor 0 - Kahn Building	Room No. 217 - Floor 2 - Kahn Building	Room No. 250 - Floor 2 - Lady Davis Building
Session Chair: Pinar Bilge ( <i>Technische Universität Berlin</i> )	Session Chair: Holger Kohl ( <i>Technische Universität Berlin, Fraunhofer IPK</i> )	Session Chair: Ehud Kroll ( <i>ORT Braude College</i> )	Moderators: Gideon Levy ( <i>TTA Technology Turn Around</i> ), André Bergmann ( <i>Fraunhofer IPK</i> ), Bernd Muschard ( <i>Technische Universität Berlin</i> ) and Rodrigo Pastl Pontes ( <i>Fraunhofer IPK</i> )
<p><b>Investigating Current Smart Production Innovations in the Machine Building Industry on Sustainability Aspects</b> (ID: 169)</p> <p><u>M.W. Waibel</u>, G.A. Oosthuizen, D.W. du Toit (<i>Stellenbosch University</i>)</p>	<p><b>Competences Mapping as a Tool to Increase Sustainability of Manufacturing Enterprises</b> (ID: 28)</p> <p><u>Giampaolo Campana</u>, Francesco Melosi, Barbara Cimatti (<i>University of Bologna</i>)</p>	<p><b>The Sustainable Co-Design of Products and Production Systems</b> (ID: 48)</p> <p><u>Pasuree Lumsakul</u>, Shahin Rahimifard (<i>Loughborough University</i>), Leila Sheldrick (<i>Imperial College London</i>)</p>	<p>Companies that want to stay competitive in the future need flexible and highly efficient production systems – systems that take account of ecological aspects and the scarcity of resources, but can respond to increasing differentiation in customer demand as well. This leads to a higher number of variations with smaller batch lots for each variant. The consequences of adopting this novel production technology on industrial sustainability are not yet well understood. Benefits can be found across the product and material life cycles, through product and process redesign, improvements to material input processing, make-to-order component and product manufacturing or a closed loop material cycle.</p> <p>This workshop gives a short insight into the state of the art research for the industrial as well as prosumer-oriented sustainable application of additive manufacturing. Within the framework of a round table (World Café), sustainability-oriented advantages, disadvantages and new approaches will be recorded and discussed in small individual groups.</p>
<p><b>Sustainability Impact of Digitization In Logistics</b> (ID: 171)</p> <p><u>Yasanur Kayikci</u> (<i>Turkish-German University</i>)</p>	<p><b>Implementation of Lean Production Systems in Small and Medium-Sized Pharmaceutical Enterprises</b> (ID: 87)</p> <p><u>Felix Sieckmann</u>, René Helm (<i>Technische Universität Berlin</i>), Hien Nguyen Ngoc (<i>Vietnamese-German University</i>), Holger Kohl (<i>Fraunhofer IPK</i>)</p>	<p><b>The Industrial Symbiosis in the Product Development: An Approach through the DFIS</b> (ID: 54)</p> <p><u>Gabriel C. Mantese</u>, Michael J Bianchi, Daniel Amaral (<i>University of São Paulo</i>)</p>	
<p><b>Methodological Framework for Life Cycle Sustainability Analysis of the Australian Food Industry</b> (ID: 161)</p> <p>Murilo Pagotto, Anthony Halog (<i>University of Queensland</i>)</p>	<p><b>An Efficiency-Oriented Batch Reduction Procedure for Hazardous Material</b> (ID: 29)</p> <p>Friedrich A. Halstenberg, Rainer Stark (<i>Fraunhofer IPK; Technische Universität Berlin</i>), Eleanor Chen, Guido Rumpel, Ralph Schneider (<i>Siemens AG</i>)</p>	<p><b>Development of a Procedure for Analysis of Failure Chains in Complex Mechatronic Systems to Improve Sustainability</b> (ID: 26)</p> <p>Nadine Schlüter, Ovidiu Bielefeld, <u>Hendrik Dransfeld</u> (<i>Bergische Universität Wuppertal</i>)</p>	
<p><b>Integrated Product and Production Engineering Approach - A Tool-Based Method for a Holistic Sustainable Design, Process and Material Selection</b> (ID: 59)</p> <p>Pascal Stoffels, <u>Jerome Kaspar</u>, Dirk Bähre, Michael Vielhaber (<i>Universität Saarland</i>)</p>	<p><b>A Study of Resource-Efficient Technologies For Megacities of the Future to Be Sustainable</b> (ID: 15)</p> <p><u>Wen Liu</u>, Steve Evans (<i>University of Cambridge</i>)</p>	<p><b>Measuring Simplicity in Mechanical Design</b> (ID: 138)</p> <p><u>Reuven Katz</u>, Niv Krayner (<i>Technion</i>)</p>	

<p><b>Development of a Classification And Generation Approach for Innovative Technologies (ID: 106)</b></p> <p><u>Alexander Pavlovitch Kuznetsov</u> (<i>Moscow State University of Technology</i>), Hans-Joachim Koriath (<i>Fraunhofer IWU</i>)</p>	<p><b>The Development of the Food Industry as a Condition for Improving Russia's National Security (ID: 127)</b></p> <p><u>Lyudmila Serga</u>, Vladimir V. Glinskiy, Natalia Samotoy, Michael Alekseev, Ekaterina Simonova (<i>Novosibirsk State University of Economics and Management</i>)</p>	<p><b>Optimization of Manufacturing Sustainability in the Ethiopian Industries (ID: 74)</b></p> <p><u>Melesse Workneh Wakjira</u>, Holm Altenbach (<i>Universität Magdeburg</i>), Perumalla Janaki Ramulu (<i>Adama Science and Technology University</i>)</p>	
	<p><b>The Influence of Waste Collection Systems On Resource Recovery. A Review (ID: 47)</b></p> <p><u>Bupe Getrude Mwanza</u>, Charles Mbohwa, Arnesh Telukdarie (<i>University of Johannesburg</i>)</p>	<p><b>Design of an Automated and Intelligent Rock Breaker: Case of Platinum Mine Platinum Company in Zimbabwe (ID: 5)</b></p> <p>Tawanda Mushiri, Charles Mbohwa (<i>University of Johannesburg</i>)</p>	
<p><b>Technion Laboratory Visit and Coffee Break</b> 16:00 – 17:30</p>			
<p><b>Farewell and end of the 15<sup>th</sup> Global Conference on Sustainable Manufacturing</b> 17:30</p>			