



PISA INTERNATIONAL CONFERENCE 2017
Spier Wine Estate, Stellenbosch
Speaker Profiles

Anton Hanekom Plastics SA		Initiatives driving Growth in the SA Plastics Industry
About the Presentation	Anton will outline current initiatives aimed at growing the South African Plastics Industry.	
Paragraph about the Speaker	Anton Hanekom is the Executive Director of Plastics SA. He joined Plastics SA in 1998 as the Training Director and has held senior management and consulting positions in the transport, heavy manufacturing, agriculture, automotive, economic development and chemical sectors. Anton has a Master's degree in Industrial Psychology and is determined to grow the South African Plastics Sector.	
Prof. Dr.-Ing. Stephan Kallweit University of Applied Sciences Aachen/Tshwane University of Technology		Mobile Robotics in the context of Industry 4.0
About the Presentation	"Industry 4.0" is more than standard industrial automation with additional intelligent sensors. The complete scenario includes new ways of logistics, supply chain management, data acquisition, prediction and online adaptation of the manufacturing process. The "smart" factory should adapt over time to the needs of the production process. One major component is robots, which can act autonomously and solve specific tasks on their own.	
About the Speaker	Prof. Stephan Kallweit is professor for Automation and Robotics at the University of Applied Sciences Aachen and the Tshwane University of Technology. His main research field are autonomous mobile systems and the necessary sensors. Prof. Jörg Wollert is a colleague of Prof. Kallweit and one of the leading industry 4.0 research fellows in Germany, giving a lot of concrete input to the main topics Industry 4.0 is nowadays about. Prof. Nils Luft is specialized in Production planning, intra logistics and Factory planning and as well member of the University of Applied Sciences Aachen.	
Dr Oliver Damm		The Path Towards Industry 4.0 – Challenges and Opportunities
About the Presentation	The rapid emerging digitalisation and integration of products, processes, and information flows is enabling and driving industrial transformation. Industry 4.0 offers many opportunities but also challenges, for instance with regard to employment and small and medium enterprises, especially in developing and medium income countries. This talk offers an introduction to Industry 4.0 as well as	





PISA INTERNATIONAL CONFERENCE 2017

Spier Wine Estate, Stellenbosch

Speaker Profiles

About the Speaker

a local perspective through a case study of a local manufacturing SME.

Dr Oliver Damm is a Professional Engineer and holds a PhD in Metallurgy and Materials Engineering as well as a Master's Degree in Engineering Management. He is an Associate Professor Extraordinary in the Industrial Engineering Department at the University of Stellenbosch. Since 2007, Oliver is a partner in LHA Management Consultants (Pty) Ltd, a business consulting firm focusing on techno-economics, industry analysis and development, feasibility analysis and business strategy development, business performance benchmarking, and innovation and programme management. Since April 2014, he is a Senior Advisor in South Africa for the Fraunhofer Gesellschaft, Germany, which is Europe's largest applied research and technology development organisation.

Janine Basson PETCO

Towards an understanding of the role of consumers in transitioning to a circular economy in South Africa.

About the Presentation

A circular economy is one that builds economic, natural and social capital as opposed to the current "take, make and dispose" extractive industrial model that we know cannot continue indefinitely. It is restorative and regenerative by design, relying on system-wide innovation.

In a recycling economy specifically, consumers are significant role-players and must be adequately capacitated and empowered to understand the potential and value of recycling and the products made from recycled matter. Furthermore, in order to transition to a circular economy, consumers will need to start using their influence and buying power to drive positive recycling behaviour up the value chain through demanding products containing recycled content.

However, behaviour change hinges on awareness being raised amongst consumers.

Here, we present the case for consumers as a key driver in transitioning to a circular economy in South Africa. Using PETCO as an example, we demonstrate the need for an explicit understanding of the system within which we operate (with articulated assumptions) and we present findings from South Africa's first broad-based research into consumer recycling behaviour. We also present recommendations on how to apply these learnings into other African contexts and





PISA INTERNATIONAL CONFERENCE 2017
Spier Wine Estate, Stellenbosch
Speaker Profiles

About the Speaker	<p>the design principles that could guide future consumer campaigns beyond South Africa.</p> <p>Janine Basson’s career is an ongoing pledge towards the protection and health of our oceans – from her work with the Namibian government as an intertidal biologist, to furthering the sustainable seafood movement in South Africa through the WWF-SASSI Programme, to her current work with PETCO, the South African PET Plastic Recycling Company.</p> <p>Focussed on growing PET plastic recycling in South Africa, her vision is that South Africans understand that PET plastic is valuable, recyclable and safe to use, and use their influence to drive positive recycling behaviour through demanding products containing recycled content.</p>
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Annabe Pretorius Plastix 911 Plastics Recycling – Can it rescue the image of plastics?	
About the Presentation	Plastics recycling is often seen as the only viable solution for litter, marine waste, irresponsible consumer behaviour, design boo-boos and misinformed legislation. Annabe will highlight what recycling is currently doing, what it still can do and what it can’t achieve.
About the Speaker	Annabe is the spokesperson for the South African Plastics Recycling Organisation and is a consultant to the plastics industry. She is passionate about plastics and spreads the good facts about these synthetic materials wherever she goes.

Dr Vincent Ojjo CSIR Nanomaterials Industry Development Facility: Bridging the R&D-Industry Gap	
About the Presentation	The polymer processing facility within the DST-funded Nanomaterials Industry Development Facility (NIDF) at CSIR, seeks to enhance the local polymer industry competitiveness by providing a pilot scale platform for new polymeric materials development. Its offering rests on three pillars: Polymer scale up equipment; Testing facility and access to researchers. It aims to assist researchers bridge the R&D – Industry gap, by providing scale up facility in the form of a <i>40 L/D co-rotating twin screw extruder; 5-layer blown film extrusion line (25 & 20</i>





PISA INTERNATIONAL CONFERENCE 2017

Spier Wine Estate, Stellenbosch

Speaker Profiles

<p>About the Speaker</p>	<p><i>mm diameter screws); 5-layer cast sheet extrusion line; 500kN injection molding machine and access to skilled researchers, technical expertise and world-class characterisation facility. Polymer formulation and compounding can now be done in large enough quantities, which can be used for market testing, thus assisting researchers with the journey to industrialisation.</i></p> <p>Dr. Ojijo is responsible for the NIDF facility at the National Centre for Nanostructured Materials, CSIR. He holds a D.Tech: Polymer Technology (TUT), as well as M.Tech in Chemical engineering (TUT) and Honours degree in Chemical & Process Engineering (Moi University)</p>
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<p>Dr Mandla Vincent Khumalo Tshwane University of Technology</p>	<p>Toughness Assessment of Thermoplastic Nanocomposites by the Essential Work of Fracture (EWF) Approach</p>
<p>About the Presentation</p>	<p>The essential work of fracture (EWF) approach is widely used to determine the plane stress fracture toughness of highly ductile polymers and related systems. Though the EWF method is dominantly used for mode-I type loading, it has been successfully adopted for mode-II and mode-III type deformations, too. Moreover, attempts were also made to deduce plane strain toughness values from EWF tests. According to the EWF, the total work of fracture (Wf) can be partitioned into two components: (i) the EWF (We) consumed in the inner fracture process zone to create new surface and (ii) the nonessential (or plastic) work (Wp) performed in the outer 'plastic' deformation zone. Nanofiller concentration and surface treatment on the morphology and viscoelastic behaviour of polypropylene (PP)/boehmite alumina (BA) nanocomposites was investigated</p>
<p>About the Speaker</p>	<p>Mandla Vincent Khumalo is on a post-doc fellowship program at TUT</p>

<p>Laura Thurn FH Aachen University of Applied Sciences - GoetheLab</p>	<p>Additive Manufacturing – if not now - then when?</p> <p>Or:</p> <p>Teaching Additive Manufacturing - Goal- and solution-oriented approach</p>
<p>About the Presentation</p>	<p>The technical state of Additive Manufacturing is currently very far ahead of the knowledge, especially of potential new</p>





PISA INTERNATIONAL CONFERENCE 2017

Spier Wine Estate, Stellenbosch

Speaker Profiles

About the Speaker

users. In addition, this gap is continually increasing, a number of research teams and manufacturers/distributors, which are now barely perceptible, is active worldwide. In order to remain competitive or to generate and maintain a lead, it is imperative to make the use of this technology easy for industry and to close this gap as soon as possible.

This gives rise to an urgent need for basic and advanced training on the basis of secure foundations. "We must know the technology with all its opportunities, possibilities and potential, but also with its hurdles and challenges, in order to successfully classify and integrate them."

The talk draws up a holistic concept that integrates different target groups (from primary school to industrial production) and discusses selected tools for the implementation at different levels.

Laura Thurn is working as a Research Assistant and Lecturer in the "GoetheLab for Additive Manufacturing", a research group of the University of Applied Sciences Aachen – Germany. In the course of her doctorate, she deals with the subject of Training and dissemination of Additive Manufacturing / 3D Printing.

Patrick Wiesen FH Aachen

Vision based autonomous flying for logistic purposes

About the Presentation

Flexible logistics is one of the key challenges for Industry 4.0. Customized products need to be manufactured and delivered just in time. Autonomous mobile robots can support production as well as parcel delivery tasks. Multicopters can be used as part of the supply chain, transporting single parts or to monitor the warehousing procedure. A variety of sensors is necessary for perception especially in GPS denied environments. The tasks of localization, obstacle avoidance, navigation with path planning and safe autonomous landing have to be solved.

About the Speaker

Research assistant supervised by Prof. Dr.-Ing. Stephan Kallweit in the field of mobile and industrial robotics. M.Sc. in Mechatronics, teaching Robotics and Advanced Robotics at University of Applied Sciences in Aachen, Team leader in Mohamed Bin Zayed International Robotics Challenge.





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Speaker Profiles

Alexander Schwarz
Tshwane University of
Technology / lwF GmbH

New design possibilities for welding of AM parts

About the Presentation

In the last few years, there was an increasing demand for large metallic parts manufactured by additive manufacturing. But most of today's even big machines are limited to a build size of around 250x250x250 m³.

To build larger parts, the joining of different components by welding is one solution. Besides making bigger parts, the new additive manufacturing process opens up new design features but also implicates challenges when it comes to an adapted welding process.

This presentation will show the new possibilities in designing parts, and how the new challenges are solved.

About the Speaker

Alexander Schwarz is working as research assistant at the Institute for tool-less production in Aachen (Germany) and is a doctoral student at the Tshwane University of Technology. He earned his Bachelor and Master degree at the Aachen University of applied Sciences. In 2013 he received the diploma as an International welding engineer.

His research field is the combination of joining technology with the new possibilities given by Additive Manufacturing of metallic parts.

Maximilian Kunkel
Siemens AG

Statistical Assessment of mechanical properties of powder-bed-fused specimen.

About the Presentation

Additive Manufacturing of metallic parts (powderbed fusion process) is gaining increasing industrial attention as it facilitates the production of complex geometries and offers lower production costs in small lot sizes. Additive Manufacturing is often described as disruptive technology in the context of digitalization and industry 4.0. The paper will address the question which material properties can be reproducibly achieved and how these perform opposite conventional, industrially standardized material properties.





PISA INTERNATIONAL CONFERENCE 2017

Spier Wine Estate, Stellenbosch

Speaker Profiles

About the Speaker

M.Sc. Maximilian Hugo Kunkel is an international student at TUT and does his doctors degree on the topic “Technical and economic characteristics and predictability of the Selective Laser Melting process” under the supervision of Prof. Dr. -Ing. Andreas Gebhardt, key senior expert for additive manufacturing, Prof. Dr. Khumbulani Mpofo, key expert for industrialization of new production systems and Prof. Dr. -Ing. Stefan Kallweit, key expert on robotics and automation.

M.Sc. Maximilian Hugo Kunkel is employed as R&D Project Manager for additive manufacturing technologies at Siemens Mobility Division in Germany and leader of the task force “Admission” at the society “Mobility goes additive”.

As appointed member of:

- the committee of experts for additive manufacturing at the association of German Engineers,
- the task force “Additive Manufacturing and welding of railway transportation systems at the German Welding Society,

He is working on the standardization of additive manufacturing technologies to enable further market penetration (industrialization) of this relatively young technology.