

# DAY 1

# RAPDASA

RAPID PRODUCT DEVELOPMENT ASSOCIATION OF SOUTH AFRICA

WEDNESDAY,  
06 NOVEMBER 2019

07:30	REGISTRATION					
09:00	Welcome and opening – Chairperson RAPDASA 2019 conference organizing committee - Prof Deon de Beer					
<b>PLENARY SESSIONS: Cheetah 1</b>						
09:15	Welcoming by CUT management: Prof Alfred Ngowi – DVC Research Innovation and Engagement					
09:45	Dr Terry Wohlers – Wohlers Associates, Inc, USA: Scaling AM into Production					
<b>10:30</b>	<b>TEA BREAK</b>					
11:00	Prof Eric MacDonald - Youngtown State University, USA: 3D Printed Bionics: Electronics in Additive Manufactured Structures					
11:40	Prof Alain Bernard - Central Nantes, France (Skype presentation) - A systemic approach of the AM-based value chain - challenges and future trends					
12:20	Markus Glasser (Vice-president of EOS): Future and digitalization of manufacturing - impact to a healthy planet					
<b>13:00</b>	<b>LUNCH BREAK</b>					
<b>TECHNICAL PRESENTATIONS (3 BREAKAWAY SESSIONS)</b>						
	<b>VENUE: CHEETAH 1</b>		<b>VENUE: CHEETA 2A</b>		<b>VENUE: CHEETA 2B</b>	
	<b>Session Chair: Prof Willie du Preez</b>		<b>Session Chair: Prof Anton du Plessis</b>		<b>Session Chair: Dr Gerrie Booysen</b>	
	<b>Theme: AM process development and material evaluation</b>		<b>Theme: Biomimetic engineering for AM</b>		<b>Theme: AM business development</b>	
14:00	Implications of porosity, residual stress and microstructure on the structural integrity of Selective Laser Melting produced Ti6Al4V	T.H. Becker (62)	Invited talk – Biological inputs into biomimetic design for AM	C. Broeckhoven	Additive Manufacturing – reinventing the supply chain	H.L. van der Merwe (81)
14:20	Influence of prior-beta grain texture on deformation isotropy in SLM-produced Ti6Al4V	G.M. Ter Haar (65)	Bone regeneration on lattice structures of titanium alloys produced by LPBF	I. Yadroitsava (73)	Powder management strategy for additive manufacturing	A. Ellis (85)
14:40	Effect of laser power on hardness and wear rate of additive manufactured hybrid Ti6AL4V MMCS	F. Ochonogor (68)	Biopolymer development suitable for additive manufacturing and bone tissue engineering	J. Fourie (76)	Transitioning from ISO 13485 to AS 9100D for an additive manufacturing organisation	D.W. Gibbons (87)
15:00	The validation of SLM Ti64 builds through small part testing: microstructure and surface morphology length-scale thresholds	N. Macallister (71)	Mechanical properties of complex structured Zr-based bulk metallic glass fabricated by laser powder bed fusion	J. Wegner (78)	Viva la revolution! – How South Africans can embrace the fourth industrial revolution	C. Plekker (89)
<b>15:20</b>	<b>TEA BREAK</b>					



# DAY 2

# RAPDASA

RAPID PRODUCT DEVELOPMENT ASSOCIATION OF SOUTH AFRICA

**THURSDAY,  
07 NOVEMBER 2019**

08:00	Opening and Welcome: Chairperson RAPDASA 2019 conference organizing committee - Prof Deon de Beer					
<b>PLENARY SESSIONS: Cheetah 1</b>						
08:15	Olivier Diegerick - Siemens: From prototyping to manufacturing. Siemens' vision on how to industrialize additive manufacturing					
09:00	Prof Amir Zadpoor - Delft University of Technology, Netherlands: Porous metallic biomaterials and metamaterials					
09:45	Prof Frank Brückner - Technische Universität Dresden, Germany: Natural inspired Additive Manufacturing and related applications					
<b>10:30</b>	<b>TEA BREAK</b>					
11:00	Prof Paulo Bártolo - University of Manchester: Shaping the future through digital technologies					
<b>TECHNICAL PRESENTATIONS (3 BREAKAWAY SESSIONS)</b>						
	<b>VENUE: CHEETAH 1</b>		<b>VENUE: CHEETA 2A</b>		<b>VENUE: CHEETA 2B</b>	
	<b>Session Chair: Dr Malan van Tonder</b>		<b>Session Chair: Heinrich Moller</b>		<b>Session Chair: Dr Jacques Combrinck</b>	
	<b>Theme: AM material, process monitoring and modelling</b>		<b>Theme: Biomimetic engineering for AM</b>		<b>Theme: Product development</b>	
11:40	Invited talk - Digital Material - At the Crossroad of Additive Manufacturing.	R. Meshel	Invited talk - Latest developments in biomimetic simulation-driven design	R. Kunju (Skype Presentation)	Development of a nozzle for introducing a multi-component adhesive into a rock anchor using additive manufacturing	M. Delport (138)
12:00	Constitutive numerical modelling in additive manufacturing: Challenges in predicting the yield strength and flow properties of alloys	A.M. Muiruri (126)	Production of large topologically optimised structures using freeform wire + arc additive manufacture	S.W. Williams (134)	Static testing of large polymer article	L. Mamushiana (141)
12:20	Acoustic emission for LPBF single track formation at different layer thickness	D. Kouprianoff (129)	An organic & optimized AM solution to a custom braking support structure	C. Hands (136)	Ferro alloy powder spherodisation by thermal plasma treatment	H. Bissett (144)
12:40	Development of an integrated powder bed fusion additive manufacturing monitoring system: A concept	F. Du Rand (132)	An affordable & customizable AM-enhanced alternative to a SCARA robot application	C. Rossouw (137)	Next generation directed energy deposition additive manufacture processes	S.W. Williams (147)
<b>13:00</b>	<b>LUNCH BREAK</b>					

	Session Chair: Dr Lameck Mugwagwa		Session Chair: Prof Igor Yadroitsev		Session Chair: Francois du Rand	
	Theme: AM material evaluation and post processing		Theme: Biomimetic engineering for AM		Theme: Product development	
14:00	The fatigue life of direct metal laser sintered Ti-6Al-4V analysed through an alternative non-destructive test	S. Botha (150)	A unique lightweight optimized AM titanium solution to a high-end competition mountain biking challenge	B. Blakey-Milner (161)	Development of Wire + Arc Additive Manufacture system for large scale metallic structure	J. Ding (166)
14:20	Wire and arc additive manufacture of highly conducting pure copper	S.W. Williams (152)	Comparison of regular tessellated lattice and simulation-optimized lattice	N. Minnaar (162)	The development of additive manufactured components for application in organic Rankine cycle systems	G.G. Jacobs (169)
14:40	Improving the microstructure of high speed selective laser melted Ti6Al4V components by varying residence time during heat treatment	P.M. Lekoadi (155)	An ergonomic & light-weight AM steering wheel with integrated driver controls & telemetry feedback	Z. Imraan (164)	Development and characterisation of a Ti6Al4V additive manufactured compact counter-flow heat exchanger for application in organic rankine cycles	S.C. Venter (172)
15:00	Microstructure and microhardness of heat treated of 17-4 PH stainless steel produced by LENS technique	I. Mathoho (158)	The importance of finite element analysis simulation tools in additive manufacturing	M Khodja (165)	Industry case study: Process chain for manufacturing of large hybrid tools with conformal cooling channels	D. Hagedorn-Hansen (175)
<b>15:20</b>	<b>TEA BREAK</b>					
	Session Chair: Dean Kouprianoff		Session Chair: Dr Ina Yadroitsava		Session Chair: Dr Maina Maringa	
	Theme: AM process development and post processing		Theme: Biomimetic engineering for AM		Theme: AM process development and material evaluation (polymers)	
15:40	A method for selecting residual stress management techniques in selective laser melting	L. Mugwagwa (178)	Deformation mechanisms of laser powder bed fusion (L-PBF) Ti6Al4V diamond and octet truss lattice structures	G. Tshikwand (183)	Development of a method of additive manufacturing by material extrusion along 3-dimensional curves	D.M. Kirkman (194)
16:00	Optimum process parameters for Nitinol (Ni-55%Ti-45%) by laser powder bed fusion	T. Mphafudi (181)	Linear static prediction of the behaviour of anisotropic structures	E. Fourie (186)	Open source process optimisation with fused filament fabrication	G.P. Greeff (198)


# DAY 2

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THURSDAY,  
07 NOVEMBER 2019

16:20	Numerical simulations of metal AM processes and geometry optimisation	M. Pereme	Designing a full ossicle implant based on the middle ear bones using freeform CAD and micro printing.	P. van der Walt (188)	Determining optimal scanning speed for laser sintering of CP75 polypropylene powder	J. Nsengimana (200)
16:40			Evaluation of lattice structures as cooling channels in Alumide® inserts for the injection moulding process	W.A Kinnear (191)	Recycling of polypropylene powder used in laser sinter additive manufacturing – A literature review	F.M. Mwanja (203)
17:00	<b>RAPDASA ANNUAL GENERAL MEETING</b>					
19:00	<b>GALA DINNER</b>					

**3D PRINTING SYSTEMS**

**RAPID 3D**

**METALHEART**  
ADDITIVE MANUFACTURING

**CRPM**

# RAPDASA

## 3D DESIGN COMPETITION

### DESIGN-ABILITY

Design that improves the quality of life

**3D PRINTERS AND PRINTING VOUCHERS TO BE WON**

UP Mini 2 (x2)      UP300      UP Mini 2 (x2)

# DAY 3

# RAPDASA

RAPID PRODUCT DEVELOPMENT ASSOCIATION OF SOUTH AFRICA

FRIDAY,  
08 NOVEMBER 2019

08:00	Opening and Welcome: Chairperson RAPDASA 2019 conference organizing committee - Prof Deon de Beer					
<b>PLENARY SESSIONS: Cheetah 1</b>						
08:15	Prof Nataliya Kazantseva - Russian Academy of Science, Russia: Comparative analysis of the structure and properties of titanium and cobalt medical alloys manufacturing by 3D printing (abstract on page 206)					
09:00	Prof Ian Gibson - University of Twente, Netherlands: Taking AM seriously: The move towards mainstream industrial manufacturing					
09:45	Martin Sanne - CSIR : Demystifying 4IR					
<b>10:30</b>	<b>TEA BREAK</b>					
11:00	Woman in 3D printing - Malika Khodja					
<b>TECHNICAL PRESENTATIONS (3 BREAKAWAY SESSIONS)</b>						
	<b>VENUE: CHEETAH 1</b>		<b>VENUE: CHEETA 2A</b>		<b>VENUE: CHEETA 2B</b>	
	<b>Session Chair: Prof Michele Truscott</b>		<b>Session Chair: Prof Didier Nyembwe</b>		<b>Session Chair: CP Kloppers</b>	
	<b>Theme: Medical application of AM</b>		<b>Theme: AM for casting and tooling</b>		<b>Theme: Design for AM</b>	
11:40	The use of nano-modification towards osseointegrative capacity of Ti-based implants: A systematic review	N. Nhlapo (209)	Establishment of a quality assurance framework methodology for additive manufacturing chemical coated sand	P.J.M. van Tonder (219)	Benefits of reinforced meshing and materials testing of 3D printed parts to assist mechanical design in the railway infrastructure environment	A.D. Toth (229)
12:00	Changing world of external maxillofacial prosthesis manufacturing	I. van Heerden (211)	Cost effectiveness of direct metal laser sintered Maraging steel inserts for the plastic injection moulding process	J. Combrinck (221)	Design for additive manufacturing: An introduction to design rules and constraints for high speed SLM	D.C. Bester (231)
12:20	Minimal invasive treatment of orbital hydatid cyst in paediatric patient using 3D printed positioning guide	J. Els (214)	Application of Six Sigma framework to rapid sand casting	A.C. Sithole (223)	Preservation of culture in a 3D printed future	J. Bresler (233)
12:40	Feasibility of additive manufacturing for patient-specific knee replacements	B.D. Nortje (217)	Comparison of slurry formulations for gel-casting of titanium	J. Piek (226)	Optimisation of support structures in high speed selective laser melting	D.C. Bester (235)
<b>13:00</b>	<b>ACKNOWLEDGEMENTS: Chairperson of RAPDASA 2019 - Prof André van der Merwe</b>					
<b>13h20</b>	<b>CLOSING - LUCKY DRAW Sponsored by BUILD VOLUME</b>					
<b>13h30</b>	<b>LUNCH</b>					

