3rd Workshop on Metal Additive Manufacturing in Liège 28-29 May 2018

Auditorium Dick Annegarn
Sart-Tilman Campus in Liège

Organization Committee

Prof. Anne MERTENS, *Metallic Materials for Additive Manufacturing*, Aerospace and Mechanical Engineering, Liege University.

Prof. Pierre DUYSINX, *Automotive Engineering, Aerospace and Mechanical Engineering*, Liege University.

Dr. Anne-Marie HABRAKEN, *Materials and Solid Mechanics*, Vice dean in charge of Research, Liege University.

With the kind support of:

Monday 28th May 2018

	Welcome Ceremony
9:30-10:00	**Key note lecture 1**, *From the aeronautical structure to the biological cells in Additive Manufacturing*– **JY. Hascoët / E C Nantes**
10:00-11:00:	**Session 1 - Mechanical behaviour**
	10:00-10:20: *Mechanical behavior and thermal stability of a dual-phase α+α' titanium alloy produced by Electron Beam Melting* – **B. Hary,** C. de Formanoir, G. Martin, T. Dessolier, F. Prima, S. Allain, F. Sun, S. Godet
	10:20-10:40: *Selective Laser Melting of AlSi10Mg : influence of the thermal history during the process on the microstructure and mechanical properties* – **J. Delahaye,** J. TchoufangTchuindjang, AM. Habraken, A. Mertens
	10:40-11:00: *Effect of process parameters and post-treatments on the mechanical static and fatigue properties of AlSi10Mg SLM samples* – **C. van der Rest,** M. Marteleur, A. Simar, P. Jacques, G. Couturiaux, S. Godet
11:00-11:20:	**Coffee Break**
11:20-12:40	**Session 2- Numerical models**
	11:20-11:40: *Thermal analysis of the laser beam melting process: comparison between numerical simulations and infrared camera measurements* – **A. François**, L. Arbaoui, P. Schrooyen, N.Poletz
	11:40-12:00: *Sensitivity analysis of melt pool – Finite Element prediction in laser cladding process of HSS material* – **R. Jardin**, N. Hashemi, T. Hoang Son, A. Mertens, AM. Habraken
	12:00-12:20: *Local/Global strategy for distortion prediction in additive manufacturing* – **B. Wucher**, L. Arbaoui, F. Lani, A. Crutzen, N. Poletz
	12:20-12:40: *Numerical models to predict phase amount during laser cladding process of Titanium alloy* – **T. Hoang Son**, E. Esteva, J. Tchoufang Tchuindjang, H. Paydas, AM. Habraken
12:40-14:00	**Lunch**
14:00-14:30	**Key note lecture 2**, *Productivity and quality improvement through custom tailored exposure strategy and parameters on AlSi10Mg* – **F. Lani / Any Shape**
14:30-15:30	**Poster Session**
	Manufacture and optimization of railway parts using SLM – A. Damiens, H. Bonnefoy, I. Titeux-Peth
	Surface finishing of metallic additive manufacturing parts – F. Duminica, N. Nutal, S. LeCraz, JF. Van Humbeeck, C. Archambeau
	Finite element activation strategy in the numerical simulation of additive manufacturing processes – C. Laruelle, R. Boman, L. Papeleux, JP. Ponthot
	Microstructural and Thermal Characterization of 316L+WC Composite CoatingsProcessed by Laser Cladding – T. Maurizi Enrici, J. Tchoufang Tchuindjang, A. Mertens
	Printing guidelines development for downfacing surfaces for differed downfacing angles – U. Paggi, L. Thijs, B. Van Hooreweder
	Investigation of occurrence of recrystallization during AM of a thick Ti6Al4V deposit – H. Paydas, T. S. Hoang, R. Carrus, A. Mertens, AM. Habraken, J. Tchoufang Tchuindjang
	Effect of scan strategy and laser parameters on roughness of SLM AlSi10Mg thin-walls – O. Poncelet, C. Van der rest, M. Marteleur, A. Simar
	Powder Flow Characterization for Additive Manufacturing – Q. Ribeyre
	Design of microstructures using stress-based topology optimization – M. Collet, M. Bruggi, L. Noël, P. Duysinx
	Overhanging constraints in additive manufacturing using image processing tools – S. Bauduin, M. Collet, E. Fernandez, P. Alarcon, P. Duysinx
15:30-15:50	**Coffee Break**
15:50-16:50	**Session 3 - About Surface / About Powder**
	15:50-16:10: *Bulk characterization and surface processing of Invar 36 made by selective laser melting* – **N. Nutal**, D. Mercier, JF. Van Humbeeck, N. Jimenez, C. Georges
	16:10-16:30: *Critical assessment of the hydrogen uptake during the powder-bed laser 3D-printing of Al-Si grade* – P. Jacques, C. van der Rest, **M. Marteleur**, X. Bollen, P. Delroisse, A. Simar, C. Georges
	16:30-16:50: *The post finishing of AM Ti-6Al-4V parts manufactured by electron and laser powder bed technologies using the ISF REM surface tribofinishing process* – M. Anh Tran,**T. Kairet**

Tuesday 29th May 2018

9:00-9:30	**Key note lecture 3**, *Topology Optimization for Metal Additive Manufacturing: Recent Developments and Computational Challenges* – **M. Langelaar / TU Delft**
9:30-10:50	**Session 4 - Innovative Designs using Topology Optimization**
	9:30-9:50: *Control of maximum member size in topology optimization for industrial AM applications* – **F. Duboeuf**, E. Lemaire, A. Remouchamps, M. Collet, E. Sanchez, P. Duysinx, D. Garray, M. Janssens, V. Capizzi
	9:50-10:10: *Imposing minimum gap distance in topology optimization through maximum size constraints* – **E. Fernandez-Sanchez**, M. Collet, S. Bauduin, P. Alarcón, E. Lemaire, P. Duysinx
	10:10-10:30: *Overhang limitation in a level-set topology optimization framework by means of geometric constraints* – **M. Jansen**, E. Wyart
	10:30-10:50:*Topology optimization integration in a virtual design software suite* – F.Duboeuf, **E. Lemaire**, A. Remouchamps, S. Gohy, C. Grappasonni, M. Bruyneel, C. Chary, M. François
10:50-11:10	**Coffee Break**
11:10-12:30	**Session 5 - Industrial Applications**
	11:10-11:30: *Topological optimization applied on 3D printed stamping tool* – **C. Chevallier**, JF. Bisson, A. Wane
	11:30-11:50: *Characterisation and design optimisation of 3D printed sand moulds for foundry* – **M. Hulin**, H. Bonnefoy
	11:50-12:10: *Linking Oxygen/Carbon/Sulphur and Nitrogen content to the Electrical charges of a metallic powder* – **Q. Ribeyre**, F. Franqui, G. Lumay
	12:10-12:30: *Powder characterization workflow for powder-bed based 3D printing processes* – **G. Lumay**, Q. Ribeyre, F. Francqui, N. Vandewalle
12:30-14:00	**Lunch**
14:00-14:30	**Key note lecture 4,** *Moving frontiers by combining additive and subtractive laser manufacturing: selective laser melting, erosion and remelting* – **JP. Kruth / KULeuven**
14:30-15:50	**Session 6 - Process**
	14:30-14:50: *Improved productivity in Direct Metal Printing of LaserForm metals* – **G. Krishna Muralidharan**, K. Lietaert, P. Van Cauwenbergh, L. Thijs
	14:50-15:10: *AM parts and process reliability: Development approach on metallic powders and in-situ thermal monitoring* – **O. Rigo**, D. Reuter, R. Carrus, G. Monfort, A. François, H. Paydas, A. Mertens
	15:10-15:30: *Pre-sintered powders of Ti-6Al-4V produced by EBM: a new way to produce AM parts*? – **S. Vivès**, O. Dumas, S. Godet
	15:30-15:50: *Additive manufacturing at Safran aero Boosters* – **O. De Vriendt**
15:50-16:10	**Coffee Break**
16:10-17:30	**Session 7 - Process / Properties**
	16:10-16:30: *Algorithm based lattice structures considering loading conditions in 3D metal printing* – **O. Zarei**, M. Voshage, S. Ziegler, JH.Schleifenbaum
	16:30-16:50: *Experimental Validation of 3D Printed Material Behaviors and their Influence on the Structural Topology Design* – **KK. Yang**, J. Hong Zhu, C. Wang, D. sheng Jia, L. long Song, W. Hong Zhang
	16:50-17:10*: On the development of innovative alpha-alpha' microstructures in 3D printed titanium: effect of microstructure coarsening on the mechanical properties* – **O. Dumas**, EL. Cadotte, S.Vivès, K. Safinowski, H. Van Swijgenhovenand, S. Godet
	17:10-17:30: *SLM AlSi10Mg mechanical behavior improvement by friction stir processing* – **J. Guillermo Santos Macías**, P. Jacques, B. Van Hooreweder, C. Elangeswaran, F. Lani, E. Maire, J. Adrien, A. Simar