2019 ADDITIVE MANUFACTURING MEETING

DISCOVER

3D Printing

International AM Users' Conference

AMM PROGRAM

WWW.3DMEETING.PL

Wrocław, Poland

18–19 SEPT, 2019

Conference **Organizers**

Wrocław University of Science and Technology

CAMT Fraunhofer Project Center

Strategic **Partners**

3YOURMIND

WADIM PLAST

ZEISS

Other **Partners**

3DGENCE

AM solutions 3D post processing

BIBUS MENOS

CAMdivision Top European NX CAM Partner

DGS

DASSAULT SYSTEMES

ITA

NANOVAL

shim-pol

SUMARIS

Honorary **Patronage**

The National Centre for Research and Development

Wrocław the meeting place HONORARY PATRONAGE OF THE MAYOR OF WROCŁAW

Co-**funding**

WROCŁAW

WCA Wrocławskie Centrum Akademickie

WEDNESDAY, 18 September 2019 (Day 1)

Session 1 | Opening of AMM 2019	
$8^{00} – 9^{00}$	Registration
$9^{00} – 9^{10}$	Prof. Edward Chlebus, *CAMT FPC Inauguration of AMM 2019*
$9^{10} – 9^{30}$	Tomasz Kurzynowski, CAMT-FPC, *Research Activities of CAMT-FPC to Accelerate AM Implementation*
$9^{30} – 9^{50}$	Jens Oldenburg, SLM Solutions *Case studies of SLM Technology in Key Markets*
$9^{50} – 10^{10}$	Harry Shipley, Trinity College Dublin *The Influence of Gas Flow During the Selective Laser Melting of Ti6Al4V*
$10^{10} – 10^{40}$	Coffee break
Session 2 | Analysis and Simulation in AM	
$10^{40} – 11^{00}$	Ingo Neubauer, Simufact Engineering GmbH *Recent Enhancements in Additive Manufacturing Simulation*
$11^{00} – 11^{20}$	Marek Slovacek, MECAS ESI s.r.o *Numerical Simulation of Additive Manufacturing Process as Support for Real Industrial Cases*
$11^{20} – 11^{40}$	Przemysław Radkiewicz, Wrocław University of Science and Technology *Simulation of Single Track Laser Metal Deposition Process of IN718 Using COMSOL Multiphysics*
$11^{40} – 12^{00}$	Coffee break
$12^{00} – 12^{20}$	Marcin Wierszycki, BUDSOFT Sp. z o.o. *Coupled Thermo-Mechanical Simulation of a Laser Powder Bed Fusion Process*
$12^{20} – 12^{40}$	Michał Krzysztoporski, CAMdivision Sp. z o.o. *Acceleration of Additive Manufacturing Process Through an Integrated End-to-End Software Solution in NX CAD/CAM/CAE*
$12^{40} – 13^{40}$	Lunch

Session 3 | Biomedical Applications	
13^{40} – 14^{10}	Paul Dalton, University of Wuerzburg, *High-resolution 3D Printing via Melt Electrowriting*
14^{10} – 14^{30}	Roman Major, Institute of Metallurgy and Materials Science PAS *Assessment of Cellular Reactivity to DNA Damage Caused by Contact With Materials Made With 3D Printing Technology, Dedicated to Face and Cranial Implants*
Session of Innovations	
14^{30} – 15^{30}	*Partners presentations of their latest achievements in Additive Manufacturing*
15^{30} – 16^{00}	Coffee break
Session 4 | Novel Applications	
16^{00} – 16^{20}	Juergen M. Lackner, Joanneum Research Forschungsgesellschaft mbH *Roughness Influence on Self-Adaptation and Self-Healing Of DLC-Mos2 Wear Protective, Low-Friction Coatings on 3D Printed Polymers*
16^{20} – 16^{40}	Sahil Panjwani, Singapore University of Technology and Design *Photopolymer Formulation for Microstereolithography 3D-Printing and Ultra-Fast High-Efficiency High-Resolution Fabrication of Microlenses*
16^{40} – 17^{00}	Łukasz Żrodowski, Warsaw University of Technology *4D Printing of Metallic Glass Composites*
Networking Session	
19^{00} – 23^{00}	Conference dinner

THURSDAY, 19 September 2019 (Day 2)

Workshops (building B-4)	
9^{00} – 10^{00}	Partners workshops
Young Scientists Poster Session (building B-4; see p. 5)	
10^{00} – 11^{10}	Poster session / Lab Tour (*CAMT Laboratory*)
11^{10} – 11^{40}	Coffee break
Session 5 | Business Solutions in AM	
11^{40} – 12^{00}	Stephan Kuehr, 3YOURMIND *From Startup Idea and University Spin-Off to a Global-Scale Company*
12^{00} – 12^{20}	Iikka Rytkönen, Etteplan Finland Oy *Reducing Costs for AM Components With Nesting*
12^{20} – 12^{40}	Sebastian Pietruszewski, 3DGence *FDM Industrial Applications for Production Lines and Low-Volume Manufacturing*
12^{40} – 13^{00}	Andrzej Zakręcki, AGH Kraków *Laser Metal Deposition Application as a New Concept Of Maintenance According to The Industry 4.0 Idea*
13^{00} – 14^{00}	Lunch
Session 6 | AM Implementation	
14^{00} – 14^{20}	Herbert Pavlíček, Carl Zeiss Microscopy GmbH *From Powder to Part: Microscopy and Measurement Solutions for Additive Manufacturing*
14^{20} – 14^{40}	Adam Wojciechowski, Mateusz Maj, DGS Poland Sp. z o.o. *Hearing Instruments Production with DLP Technology. Case study*
14^{40} – 15^{00}	Robert Sekuła, Corporative Research Center ABB *3D Printed Tooling for Casting of Bulky Epoxy Products*
15^{00} – 15^{20}	Krzysztof Kardach, Omni3D *3D Printing in Automotive Industry*
15^{20} – 15^{40}	Marta Flisykowska, Academy of Fine Arts in Gdańsk, Poland *Clay Printing – Earth Experiments on Martian Clay Simulant*
15^{40} – 16^{00}	Closing remarks & best poster award
16^{00} – 16^{30}	Good-bye coffee

THURSDAY, 19 September 2019 (Day 2)

Young Scientists Posters Session (building B-4)

1	Sandra Bednarek, Wroclaw University of Science and Technology, Poland *The Influence of Part Build Orientation on its Strength Properties and Dimensional Accuracy in MJF Technology*
2	Paula Broniszewska, Institute of Fundamental Technological Research PAS, Poland *Anodic Oxidation of AlSi10Mg Alloy Manufactured by DMLS*
3	Agnieszka Chmielewska, Warsaw University of Technology, Poland *Chemical and Electrochemical Polishing of 3D Printed Metal Parts*
4	Bianca Gomes, ISQ, Portugal *Effect of Interpass Temperature on the Properties of Al-Cu Alloys Parts Produced by Wire and Arc Additive Manufacturing*
5	Konrad Gruber, Wroclaw University of Science and Technology, Poland *Methodology of Powder Qualification for L-PBF Process on Example of Nickel-based Alloy In718*
6	Piotr Gruber, Wroclaw University of Science and Technology, Poland *Influence of Active Pharmaceutical Ingredients and Plasticizers on Processability of HPMC with FFF Technology*
7	Viktoria Hoppe, Wroclaw University of Science and Technology, Poland *Application of Alloys Based on Ternary Ti-Nb-Zr System in Additive Manufacturing – Review*
8	Michał Karoluk, Wroclaw University of Science and Technology, Poland *The Influence of Abrasive Blasting Parameters on Surface Quality of Titanium Alloy Ti-6Al-4V Parts Produced by Electron Beam Melting*
9	Dmitriy Khrapov, Tomsk Polytechnic University, Russia *Manufacturing of Ti-Nb Alloy from Elemental Powders by EBM*
10	Aleksander Kowalski, Łukasiewicz Research Network – Institute of Non-Ferrous Metals, Poland *The Influence of Various WAAM Parameters on the Microstructure of Cu-Al Alloys*
11	Marta Krawczyk, West Pomeranian Unversity of Technology, Poland *Analysis of Fused Filament Fabrication Strategy on Polyamide Properties*
12	Joanna Kulasa, Łukasiewicz Research Network — Institute of Non-Ferrous Metals, Poland *Application of the 3DMP® Technology in a Marine Industry*
13	Adrianna Mackiewicz, Wroclaw University of Science and Technology, Poland *Development of Manufacturing Method of the MAP21 Magnesium Alloy Prepared by Selective Laser Melting (SLM)*

14 Benjamin Meier, Joanneum Research Forschungsg mbh, Austria
Effect of Powder Properties on Mechanical and Physical Properties of Ti64 Processed by SLM

15 Micael Nascimento, University of Aveiro, Portugal
Cascaded Optical Fiber Sensor for Temperature and Strain Monitoring of 3D Additive Manufacturing Processes

16 Małgorzata Rusińska, Wroclaw University of Science and Technology, Poland
Mechanical Properties and Structure Analysis of PLA Bone Regeneration Scaffolds Manufactured with the Use of FFF Method

17 Krzysztof Surma, Wroclaw University of Science and Technology, Poland
The Designing Process of Personalized Products Based on Reverse Engineering Tools on the Example of an Intervertebral Disc Implant

18 Bartłomiej Świątek, HBM Prenscia, Poland
Function Integration Impact on Failure Rates in Additive Manufactured Parts

19 Patrycja Szymczyk, Wroclaw University of Science and Technology, Poland
The influence of Surface Modification Processes of Additive Manufactured Titanium Alloys on Cytotoxicity and Bacterial Activity

20 Magdalena Tomanik, Wroclaw University of Science and Technology, Poland
Mechanical Properties of HPMC For Drug Delivery Systems Manufactured using FFF Process

21 Grzegorz Treter, Wroclaw University of Science and Technology, Poland
In situ X-ray Computed Tomography Method for Structure and Mechanical Properties Analysis of Additive Manufactured Polymers

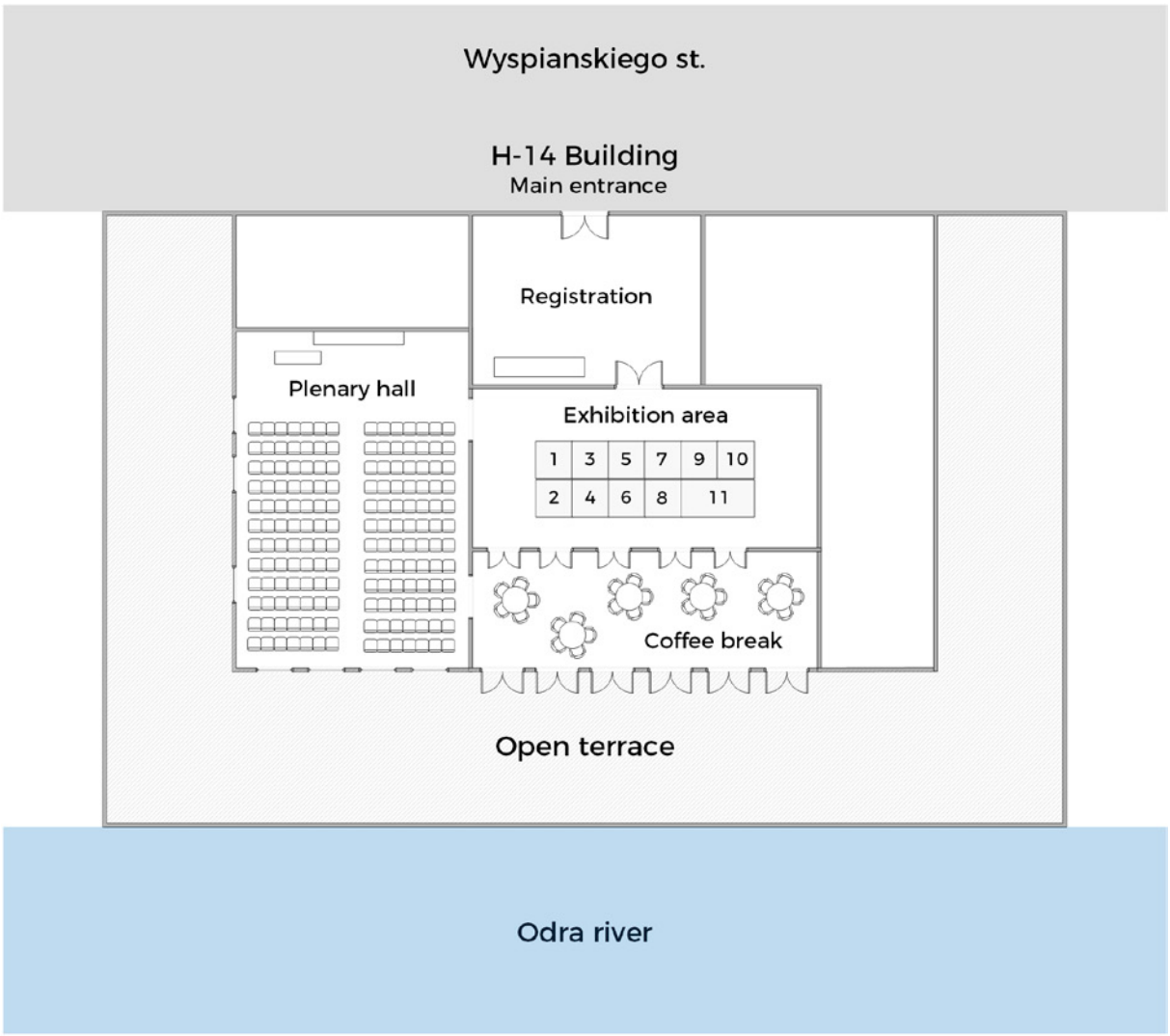
22 Christoph Weinkum, University of Applied Sciences Technikum Wien, Austria
3D Printing of Endless Fiber-reinforced Components

23 Bartłomiej Wysocki, Warsaw University of Technology / MaterialsCare, Poland
Mechanical Properties, Microstructure and Cell Behavior of CP Titanium Processed by Selective Laser Melting (SLM)

24 Michał Ziętala, Military University of Technology, Poland
The Temperature Distribution and Thermal Cycles During the 316L Stainless Steel Manufacturing by Laser Engineered Net Shaping

TECHNICAL EXHIBITION

Conference Map



Exhibition area

1	3	5	7	9	10
2	4	6	8	11	

3YOURMIND

www.3yourmind.com

3YOURMIND provides software to manage and optimize end-to-end additive manufacturing workflows, offering AM process optimization software for manufacturing companies and 3D printing services. 3YOURMIND digital platform allows communication between teams, management of production resources in many locations, which increases the efficiency of machine use and enables quick data analysis. 3YOURMIND promotes and enables the implementation of Agile Manufacturing methodologies – flexible production management.

3YOURMIND solutions include modules for identification of parts suitable for 3D printing, external and internal communication as well as order management, production controlling and planning.

3YOURMIND customers, among others, are GKN, DB Schenker, Bosch, Postnord, EOS.

Carl Zeiss Poland

www.zeiss.pl

Founded as a workshop for precision mechanics and optics in the German city of Jena in 1846, Carl Zeiss is today a global leader in the optical and opto-electronic industries. Carl Zeiss have offices in over 30 countries and are represented in more than 100 countries, with production centers in Europe, North America, Central America and Asia. The company's headquarters is located in Germany.

Most important task, as Carl Zeiss see it, is to enable science and technology to go beyond what man can see. "We make it visible." – corporate slogan, and promise to customers to open doors that were previously sealed.

Carl Zeiss is a market leaders in the majority of operation fields. Carl Zeiss offer an extraordinary spectrum of leading-edge solutions and products.

Wadim Plast

Wadim Plast has been operating in the plastics industry for over 20 years, spreading the knowledge of Rapid Prototyping, Rapid Tooling and promoting the latest solutions from leading international producers. Company offers casting method and the method of selective sintering of powders with the laser as well. Application of selective laser melting (SLM) allows quick (up to 24h) execution of tools, e.g. metal dies, steel molds for casting under pressure, steel molds for injection molding or ceramic elements and machine parts.

Wadim Plast offers 3D metal printers from SLM Solutions Group AG, those machines allow efficient production on an industrial scale of details made of metallic materials such as stainless steel, tool steel, titanium alloys, aluminum alloys and other metals that can be pulverized.

www.wadim.com.pl

3D Gence

3DGence is a polish manufacturer of professional easy-to-use 3D printers for industrial applications operating on the market since 2014.

The company helps to implement 3D printing technology offering audit, consulting and training. Its portfolio includes industrial dual extruder 3DGence INDUSTRY F340, professional dual extruder 3D printer 3DGence DOUBLE and 3DGence ONE. All devices are made of high-quality components supplied by entrepreneurs from European Union countries.

3DGence also offers professional 3D printing services, from design to production and post-processing.

www.3dgence.com

AM Solutions by Rösler Group

AM Solutions, a brand of the Rösler Group, can offer post process and finishing solutions for a broad spectrum of tasks along the entire AM production chain. These solutions can be individually adapted to customer requirements irrespective of the material type (metal, plastic, ceramic, glass, composite, etc.) or by which 3D printing technology they were produced with.

The optimum and comprehensive solution for all post processing stages, AM Solutions cover the entire spectrum of post processing tasks for additive manufactured components, including: unpacking, removal of support structures, removing residual powder and particles baked to the work piece surface, surface cleaning and smoothing, edge radiusing, high gloss polishing or surface preparation for subsequent coating.

www.am-postprocess.com

Bibus Menos

The Bibus Menos company has professional additive manufacturing systems in its offer: EOS, Sintratec, BigRep Rapid Shape, Lithoz and 3D Micro Print.

In addition to the machines themselves, Bibus Menos also offers 3D printing services (FDM from thermoplastics, PolyJet from liquid photopolymer cured with UV light, SLS from polyamide based materials, DMLS / SLM from metal powders) as well as training and consulting services in the field of technology selection and equipment for laboratories and toolmakers.

www.bibusmenos.pl
www.drukarki3d.pl

CAMdivision

Since 2007 CAMdivision has been offering comprehensive CAD/CAE/CAM/PLM solutions with a full implementation service based on the NX SIEMENS system.

Company has exceptional experience in the field of implementation of NX CAD/CAM suites and special purpose applications for the design of molds and dies in Poland, and in the development of post-processors including virtual machine simulation.

The latest offer which is dedicated for AM, includes NX Additive Manufacturing which provides a single, integrated system that meets the unique challenges of designing, optimizing and building metal and plastic components.

www.camdivision.pl

DGS

DGS Poland (Mierzyn / Szczecin) is responsible for the implementation of new products and the manufacturing of hearing aids and diagnostic equipment, as well as the management of a distribution center with a state-of-the-art high storage warehouse. The company employs experienced engineers and specialists.

DGS is a part of Demant Group – a multinational organization, which manufactures hearing aids, bone conduction hearing implants and hearing support systems. DGS operates in Poland since 2007. DGS employs 2500 people in Poland and is constantly expanding its operations, while continuously hiring new employees. To learn more on how DGS using 3D Printing (DLP Technology) in manufacturing, check their website.

www.dgs.pl

Dassault Systèmes

Dassault Systèmes has been developing technologies and solutions that propel digital transformation in industries ranging from aerospace to life sciences and is participating in more than 50 global initiatives dedicated to advance world-class production technologies and processes. Dassault Systèmes brings value to over 250,000 customers of all sizes, in all industries, in more than 140 countries.

Dassault Systèmes purpose is to provide business and people with 3DEXPERIENCE universes to imagine sustainable innovations capable of harmonizing product, nature and life. This is what Dassault Systèmes call the Industry Renaissance.

www.3ds.com

ITA

ITA is a Polish company which has been providing comprehensive metrology and tooling solutions for 20 years. ITA offer includes state-of-the-art solutions provided by leading global manufacturers of measuring equipment and cutting tools.

The solutions provided by ITA ensure the highest accuracy of measurements. ITA measuring systems and cutting tools can be used for ensuring the quality of finished products, off-line and on-line quality assurance during the production process, conducting material tests and manufacturing objects from a broad range of materials, including difficult-to-machine ones.

Several hundred Polish and foreign companies, representing a very broad spectrum of industries, have trusted ITA. Company clients' portfolio includes respected companies from the automotive, aviation, arms, machine, plastics processing and many other industries.

www.ita-polska.com.pl

NANOVAL

www.nanoval.de

Since 1988 NANOVAL develops and manufactures metal powders and turnkey plants for its production by using a patented gas atomization method.

Fields of application for the Nanoval powders are in the dental field, in additive manufacturing, in soft-, hard and active-soldering, in thermal spraying, in metal injection molding as well as for diamond tools and for shape memory components.

The powders are being produced both from NE-metals such as Al and Cu and also on the basis of steel, iron, nickel and cobalt. Additionally, precious metals such as silver, gold and platinum are also becoming increasingly important. The powders are classified on own sieving and separating equipment with straight cuts between 5 and 200 µm.

SHIM-POL

www.shim-pol.pl

SHIM-POL A.M. Borzymowski is an exclusive representative of: SHIMADZU-KRATOS, Phenomenex and Biotage in Poland.

Offer of SHIM-POL includes instruments for: Spectrophotometric analyzes (UV-Vis, FTIR, RF); Elemental analyzes (AAS, ICP-OES, ICP-MS, EDX); Chromatography and mass spectrometry (GC, LC, MS, MS / MS); Flash chromatography; Spectroscopic surface analysis (XPS, AES, UPS, ISS); Material tests: destructive and non-destructive; Sample preparation; Chromatographic columns and Phenomenex accessories.

www.sumaris.pl

Sumaris

The main activity of Sumaris is service, trade, and training. Specialists from Sumaris perform services related to the finishing, repair and/or modification of mold forming surfaces and other tools. A comprehensive package of services (welding, invoicing, engraving, polishing), as well as access to tool services (electro drilling, milling, turning), allows for servicing all orders for repair or modification of molds and tools for plastics processing.

Sumaris is also a distributor of 3D printers from OR Laser – manufacturer of industrial laser systems.

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