SIRAMM
H2020-WIDESPREAD-2018-03
Project No. 857124

International conference

East Europe Conference on AM materials

Faculty of Mechanical Engineering
University of Belgrade, Serbia
& Online

2nd-4th September 2021

Conference Programme & Book of Abstracts

Conference organized by:

Polytechnic University of Timisoara,

ROMANIA

University of Belgrade,

SERBIA

Institute of Physics of Materials, Brno,

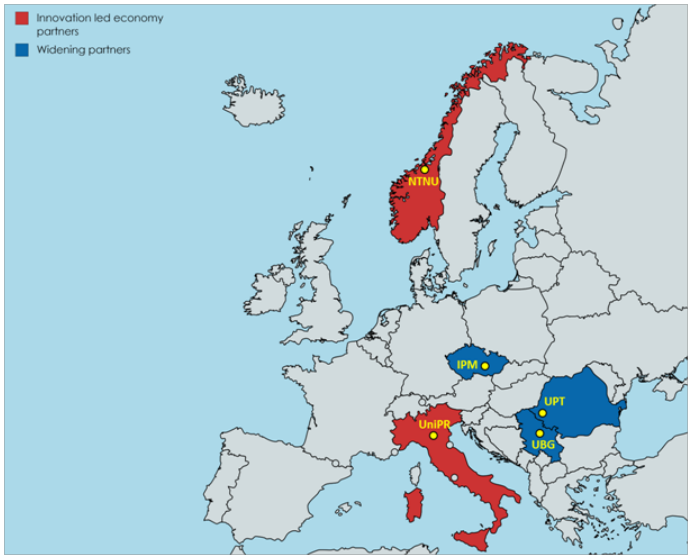
CZECH REP.

University of Parma,

ITALY

Norwegian Univ. of Science and Technology,

NORWAY



Participating institutions in SIRAMM project

Please connect to the Conference by using Zoom Meeting at this link:

https://zoom.us/j/99530434470?pwd=S3Z6Y3pCSWtRZVZxdGNOYVZoUmdwZz09

Meeting ID: 995 3043 4470

Passcode: 395628

Conference Programme

(Central European Time - Paris, Rome, Belgrade)

Thursday, 2nd September 2021

8:00-9:30	Registration of participants Faculty of Mech. Eng. (FME), Univ. of Belgrade, Serbia
9:30-10:00	Opening of the Conference and presentation of the SIRAMM project (FME & online) Prof. Liviu Marsavina
10:00-10:30	**1st Keynote lecture** (FME & online) Chairman Prof. Liviu Marsavina ***Mechanical Properties and geometric aspects in Selective Laser Sintering*** Dr. Dan Stoia (Politehnica University Timisoara, Romania)
10:30-11:00	*Coffee break* (FME)
11:00-12:45	**1st Session** (FME & online) (12 min presentation + 3 min Qs&As) Chairman: Milos Milosevic ***Characterization of AM materials***
11:00-11:15	*The strength of additive manufactured screws* Andrei Morariu, Estera Valean, Monica Buzdugan, Liviu Marsavina
11:15-11:30	*Mechanical properties of polymeric elements obtained through Digital Light Processing* Roberto Brighenti, Liviu Marsavina, Mihai Marghitas
11:30-11:45	*A green building technique: thermal transmittance value of the different materials used in 3D printed houses* Milica Ivanović, Aleksandar Simonović, Toni Ivanov, Aleksandar Kovačević, Dragoljub Tanović
11:45-12:00	*Mechanical properties of FDM printed objects as a function of the printing parameters* Corrado Sciancalepore, Daniel Milanese
12:00-12:15	*Application of additive manufacturing in jigs and fixture based manufacturing* Rohit Mishra
12:15-12:30	*How does build orientation influences the torsional capacity of hollow shaft* Marius Nicolae Baba
12:30-12.45	*Hardness analysis of additively manufactured metallic specimens* Miloš Milošević, Ivana Jevtić, Isaak Trajković, Žarko Mišković, Tihomir Ćuzović, Aleksa Milovanović, Milan Travica
12:45-14:15	*Lunch break* (FME)

14:30-15:00 **2nd Keynote lecture** (online)
Chairman: Roberto Brighenti
Gender in Science and Technology
Dr. Roxana Gita (Politehnica University Timisoara, Romania)

15:00-16:30 **2nd Session** (FME & online) (12 min presentation + 3 min Qs&As)
Chairman: Roberto Brighenti
AM technologies advancements & new experiences

15:00-15:15 *The use of 3D printing for studying the influence of ionizing radiation on electronic components*
Stefan Ilić, Miloš Vorkapić, Toni Ivanov, Jelena Svorcan

15:15-15:30 *The first bridge - prototype development through Fused Deposition Welding Modeling (FDM)*
Anamaria Ioana Feier, Felicia Veronica Banciu, Mihai Brîndușoiu, Radu Băncilă

15:30-15:45 *Additive Manufacturing of Removable Complete Dentures*
Christa Serban, Florin Ionel Topala, Meda Lavinia Negrutiu, Virgil Florin Duma, Liviu Marsavina, Cosmin Sinescu, Adrian Gh. Podoleanu

15:45-16:00 *Mechanical properties of polymer matrix composite materials produced by additive manufacturing through the finite element method*
Israel David Mantilla Bravo, Octavio Andrés González Estrada, Oscar Rodolfo Bohórquez Becerra, Sebastián Casas Parra

16:00-16:15 *KnowHub entrepreneurial projects based on Rapid Prototyping Technology: Montenegro in focus*
Jelena Šaković Jovanović, Janko Jovanović, Aleksandar Vujović

16:15-16:30 *Experiences in 3D printing applied in education*
Petar Jakovljević, Đorđe Dihovični, Ivan Bijelić, Dragan Kreculj, Nada Ratković Kovačević

16:30-17:30 **Practical session** (FME & online)
Demo from 3DRepublica company
Visit to testing and DIC Lab

Friday, 3rd September 2021

9:00-9:30 **3rd Keynote lecture** (FME & online)
Chairman: Prof. Aleksandar Sedmak
Horizon Europe – new EU framework program
Biljana Glišić (Horizon NCP, Serbia)

9:30-11:00 **3rd Session** (FME & online) (12 min presentation + 3 min Qs&As)
Chairman: Prof. Aleksandar Sedmak
Simulation of AM processes

9:30-9:45 *Machine learning applications in additive manufacturing: an assessment of the state-of-the-art and future prospects*
Lipika Mohapatra, Bikash Chandra Behera

9:45-10:00 *Link between reverse engineering and additive technology on the example of a model without technical documentation*
Miloš Vorkapić, Ivana Mladenović, Aleksandar Kovačević, Marija Baltić

10:00-10:15 *Machine Learning Module for Predicting Tensile Response of SLMed Ti-6Al-4V*
Mainak Banerjee, Ankan Banerjee, Dipayan Mukherjee, Anil K Singla, Jagtar Singh

10:15-10:30 *Modeling Selective Laser Sintering AM: an overview*
Roberto Brighenti, Andrea Spagnoli, Michele Terzano, Mattia P. Cosma

10:30-10:45 *The importance of machine learning and generative design in AM*
Aleksandra Joksimović, Ivana Medojević , Mladen Regodić

10:45-11:00 *Making a 3D Printer of Delta Configuration Using Open-Source Project*
Miroslav Aleksandrović, Nada Ratković Kovačević, Dragan Kreculj, Đorđe Dihovični, Petar Jakovljević

11:00-11:30 *Coffee break* (FME)

11:30-12:00 **4th Keynote lecture** (FME & online)
Chairman: Prof. Aleksandar Grbovic
Numerical modeling of AM processes
Roberto Brighenti (Univ. of Parma, Italy)

12:00-13:15 **4th Session** (FME & online) (12 min presentation + 3 min Qs&As)
Chairman: Prof. Lubos Nahlik
Fatigue of AM materials

12:00-12:15 *Low cycle fatigue behavior of 316L steel manufactured by selective laser melting*
Jiří Man, Ivo Šulák, Ivo Kuběna, Alice Chlupová, Lukáš Douša, Jaroslav Polák

12:15-12:30 *Numerical simulation of crack propagation in a component produced by additive manufacturing*
L. Trávníček, F. Arbeiter, P. Dlhý, M. Spoerk, L. Náhlík, P. Hutař

12:30-12:45 *Correlation between fatigue behaviour and surface roughness of Inconel718 produced by additive manufacturing*
Federico Uriati, Gianni Nicoletto

12:45-13:00 *Comparison of cyclic behaviour of SLM- and conventionally-processed 304L*
Miroslav Šmíd, Michal Jambor, Daniel Koutný, Stanislav Fintová, Ivo Kuběna

13:00-13:15 *A_MADAM project - fatigue behaviour of steels produced by DMLS*
Snežana Ćirić-Kostić, Nebojša Bogojević, Dario Croccolo, Giorgio Olmi, Zlatan Šoškić

13:15-14:15	*Lunch break* (FME)
14:15-14:45	**5th Keynote lecture** (FME & online) Chairman: Prof. Aleksandar Grbovic ***Additive Manufacturing in Aerospace Industry: Present and Future*** Ognjen M. Peković (Faculty of Mech. Eng. – Univ. of Belgrade, Serbia)
	Organized city tour
15:15 – 16:30	**Museum Nikola Tesla**
16:45 – 17:45	**Saint Sava church**
18:00 – 22:00	**River cruise & Conference dinner**

Saturday, 4th September 2021

9:00-9:30 **6th Keynote lecture** (online)
Chairman: Andrea Spagnoli
Design advanced interlocked structures via machine learning approach
Chao Gao (NTNU, Norway)

9:30-10:30 **5th Session** (FME & online) (12 min presentation + 3 min Qs&As)
Chairman: Andrea Spagnoli
Structural Integrity of AM materials

9:30-9:45 *Monitoring of crack growth in additive manufactured pipe ring specimens by digital image correlation*
Isaak Trajković , Miloš Milošević , Bojan Međo , Marko Rakin , Aleksandar Sedmak

9:45-10:00 *Estimating damping values of 3D printed ABS test specimens using the half-power method*
Ionuț Ailinei, Sergiu-Valentin Galațanu, Liviu Marșavina

10:00-10:15 *Damage mechanisms of SLM-printed 316L steel subjected to thermomechanical fatigue*
Tomáš Babinský, Ivo Šulák, Adam Weiser, Lukas Englert, Stefan Guth

10:15-10:30 *Microstructural characteristics lying behind the instability of additively manufactured Co-28Cr-6Mo alloy*
Michaela Roudnicka, Orsolya Molnarova, Jan Drahokoupil, Jiri Kubasek, Jiri Bigas, Vit Sreibr, Libor Pantelejev, David Palousek, Dalibor Vojtech

10:30-11:00 *Coffee break* (FME)

11:00-12:15 **6th Session** (FME & online) (12 min presentation + 3 min Qs&As)
Chairman: Aleksa Milovanovic
Properties and models of AM materials

11:00-11:15 *Printing parameter effect on tensile properties of FDM polypropylene material*
Aleksa Milovanović, Zorana Golubović, Ivana Jevtić, Aleksandar Sedmak, Miloš Milošević

11:15-11:30 *Model development by FDM technique of additive production using dual extrusion - advantages and disadvantages*
Tijana Lukić

11:30-11:45 *In-process monitoring of the 3D-printing and its use in the development of special cutting tools*
Miloslav Kepka, Miroslav Zetek, Pavel Hanzl, Matěj Rott, Ivana Zetková, Martin Bureš

11:45-12:00 *Implementation of additive manufacturing for solutions in agriculture*
Tihomir Cuzovic, Dusanka Colakovic

12:00-12:15 *Development and additive manufacturing of bladeless thruster*
Janko Jovanović, Jelena Šaković Jovanović, Aleksandar Vujović

12:15-12:30 *Experimental design in the quality control of the additive manufacturing process for carbon fiber-reinforced plastics*
Irina Gadolina, Sergey Smelov, Igor Maidanov

12:30-12:45 Closing of the Conference and presentation of future SIRAMM events (FME & online)

	Prof. Liviu Marsavina
12:45-13:45	*Lunch break* (FME)
	Post Conference tour
14:00 – 15:30	**Neolitic pre-historic site Vinča**
16:45 – 19:00	**Viminacium - Roman settlement**

List of Keynote lectures & Abstracts

Link between reverse engineering and additive technology on the example of a model without technical documentation

Miloš Vorkapić[1], Ivana Mladenović[1], Aleksandar Kovačević[2], Marija Baltić[2]

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ABSTRACT

Reverse engineering (RE) is a process that integrates additive technologies, while enabling finishing or modifications of an existing model, as well as the application of new ideas in design improvement. This approach leads to the reduction (or elimination) of certain steps of the product development process, and faster model digitization, with further improvements and optimization of parameters. The biggest challenge in the application of RE is the high-quality physical part reproduction with the best possible characteristics, while keeping the realization costs as low as possible. Especially in this segment additive technologies become increasingly important. In this work, RE is applied in order to fabricate a protective cover of a machine used in semiconductor production, based on the existing (damaged) physical sample. The protective cover is a part of a silicon wafer dicing saw (Micro Automation, Model 602M), and it is made of plastic. Due to the age and the long exploitation of the machine, the sample part was broken at one of its supports. Unfortunately, since the machine has become obsolete a long time ago, the spare parts cannot be found. In such cases, RE has an important role, and the fabrication of a new part would be almost unthinkable without the application of additive technology. The CAD model of the protective cover was defined based on the measured dimensions of the damaged part. The procedure is very convenient in cases when only a physical part (or a finished product) exists without technical documentation, or when the existing technical documentation is not in a digital form. We performed model optimization and load simulation on the supports for different materials. After digitization, the model manufacturing process started. The model was made of the thermoplastic polymer ABS on the 3D printer Wanhao Duplicator, type i3 plus, made in the People's Republic of China. In this paper, we intended to illustrate the significance of the symbiosis of RE and the additive technology in the process of realization of parts/assemblies of an obsolete product with no spare parts available.

ACKNOWLEDGEMENT

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