

AMaTUC **MTeM** 2017

**The 13th INTERNATIONAL CONFERENCE
MODERN TECHNOLOGIES
IN MANUFACTURING**

FINAL PROGRAM

**Cluj-Napoca
ROMANIA
12th - 13th October 2017**

WELCOME MESSAGE

Dear Guests and Friends,

On behalf of the organizing committee of the 13th International Conference MTeM 2017 - AMaTUC, I wish you a warm welcome to Cluj-Napoca!

Please find details in this program, regarding the timetable of the events and paper presentations, within the eight conference sections.

The aim of the AMaTUC - MTeM Conference is to bring together experts in Manufacturing Engineering, in order to exchange ideas and make new connections to extend and develop partnerships between the researchers from Romania and other European Countries.

The MTeM-AMaTUC Proceedings 2017 will be published online with open-access in a volume of MATEC Web of Conferences (<https://www.matec-conferences.org/forthcoming>). MATEC Web of Conferences (ISSN: 2261-236X) is indexed in major international databases: CAS, Compendex, Conference Proceedings Citation Index (Web of Science – WoS), DOAJ, Google Scholar, Inspec, Polymer Library, Scopus.

I strongly appreciate the contribution of the authors, who submitted valuable papers and agreed to do successive revisions of their papers, following the recommendations received from the reviewers.

Many thanks to the members of the Scientific Committee, who accepted to do the reviewing free of charge, which spent their time and effort to bring a substantial contribution to the AMaTUC - MTeM 2017 Conference, by providing professional evaluation of the papers and suitable recommendations.

Welcome to the Deans and other representatives from the Mechanical and Industrial Engineering Faculties from Romania, who are having the National Consortium meeting within the AMaTUC-MTeM 2017 Conference, in Cluj-Napoca.

I am grateful to the AMaTUC partners for their support in boosting the scientific excellence and innovation capacity in additive manufacturing of the Department of Manufacturing Engineering (DME) from TUCN and for their support in organizing this Conference. Bringing over the FabBUS mobile 3D Printing laboratory from Aachen is great, to be explored by the AMaTUC-MTeM Conference participants, in Cluj-Napoca.

My colleagues from the DME have done their best and without their excellent work it would have been impossible to organize this event. Thank you very much to the Organizing Committee!

Let's hope that all the participants will be having fruitful scientific activities and will spend enjoyable days, during the AMaTUC-MTeM 2017 Conference!

Professor Nicolae Balc

Chairman of the MTeM-AMaTUC International Conference



**AMaTUC - Additive Manufacturing at
Technical University of Cluj-Napoca**
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Driving TCM Cluj into future!

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**THE 13th INTERNATIONAL CONFERENCE
MODERN TECHNOLOGIES IN MANUFACTURING**

MTeM 2017

SCHEDULE OF EVENTS

WEDNESDAY October 11th		Room
18:00 – 19:00	Early registration	Reception Univers T Hotel
19:00	Welcome drink	Restaurant Univers T Hotel
THURSDAY October 12th		Room
8:30 – 9:30	Registration	Main Hall of the University (First floor)
9:30 – 10:00	Opening Ceremony	A113
10:00 – 11:30	Plenary Lectures - <i>Prof. Andreas Gebhardt (DE)</i> - <i>Prof. Ian Campbell (UK)</i> - <i>Mr. Flavien Massi (LU)</i>	A113
11:30–12:00	Coffee break	Main Hall of the University (First floor)
12:00 – 13:30	Session I	A113, Emerson, Destaco
13:45 – 14:45	Lunch break	Restaurant – Golden House
15:00 – 16:30	Session II	A113, Emerson, Destaco
16:30–17:00	Coffee break	Main Hall of the University (First floor)
17:00 – 18:30	Session III	A113, Emerson, Destaco
19:30	Conference dinner	Restaurant – Univers T Hotel

FRIDAY October 13th		Room
9.00–11.00	Session IV	A113, Emerson, Destaco
11.00–12.00	Visit and experience the mobile 3D Printing Laboratory	FabBus – Aachen
12.15–12.30	Closing Ceremony	A113
12.30 – 13.30	Lunch break	Restaurant – Golden House
14.30–17.30	Trip to Turda Salt Mine	–
18.00	Wine tasting and dinner	–

Plenary Session Lectures		Room
Thursday 10:00-10:30	1. Additive Manufacturing technology in evolution to efficiency Professor Andreas GEBHARDT, University of Applied Sciences – Aachen (Germany)	A113
Thursday 10:30-11:00	2. Design for Additive Manufacturing Professor R. Ian CAMPBELL, Loughborough University (UK)	A113
Thursday 11:00-11:30	3. Horizon 2020 opportunities and guidelines Mr. Flavien MASSI, Intelligentsia Consultants Sarl (Luxemburg)	A113

Session	Section	Room
Session I	S1: Manufacturing Engineering Chaired by: Cristian-Vasile DOICIN Nadežda ČUBOŇOVÁ	A113
	S2: Additive Manufacturing and Non-Traditional Technologies Chaired by: Ian CAMPBELL Petru BERCE	Emerson
Thursday 12:00-13:30	S4: Automation of Manufacturing Systems and Assembly Chaired by: Katarina MONKOVA Adrian TRIF	Destaco
Session II	S1: Manufacturing Engineering Chaired by: Peter MONKA Dan LEORDEAN	A113
	S2: Additive Manufacturing and Non-Traditional Technologies Chaired by: Andreas GEBHARDT Stanislaw LEGUTKO	Emerson
	S5: Metal Forming Chaired by: Laurențiu SLĂTINEANU Lucian LĂZĂRESCU	Destaco

Session	Section	Room
Session III Thursday 17:00-18:30	S1: Manufacturing Engineering Chaired by: Alexandru CĂREAN Ladislav MOROVIČ	A113
	S3: Machining Processes and Quality Assurance Chaired by: Gheorghe OANCEA Arik SADEH	Emerson
	S6: CAD-CAM Chaired by: Nicolae COFARU Cornel CIUPAN	Destaco
Session IV Friday 09:00-11:00	S7: Environmental Engineering Chaired by: Mihai BĂNICĂ Răzvan PĂCURAR	A113
	S3: Machining Processes and Quality Assurance Chaired by: Mihail Aurel ȚÎȚU Marian BORZAN	Emerson
	S8: Processes of Plastics and Composite Materials Chaired by: Liana HANCU Paul BERE	Destaco

Session I

Room A113

S1: Manufacturing Engineering

Chairmen: Cristian-Vasile DOICIN, Nadežda ČUBOŇOVÁ

- 1. Investigation on standoff distance influence on kerf characteristics in abrasive waterjet cutting of composite materials**
Alexandru Ioan Popan, Glad Contiu and Ian Campbell
- 2. Decreasing of the manufacturing time for a thermoforming mold by applying the DFM principles**
Ancuta Pacurar, Razvan Ioan Pacurar, Eross Beata, Florin Popister and Calin Otel
- 3. Implementation of lean manufacturing in romanian organisations**
Camelia Ioana Ucenic and Claudiu Ratiu
- 4. Improving performance in supply chain**
Camelia Ucenic and Claudiu Ratiu
- 5. Study of high feed cutting efficiency of aluminium alloy AW – AlZn5,5MgCu**
František Botko, Ján Duplák, Dusan Mital, Michal Hatala and Svetlana Radchenko
- 6. Analysis of shape correctness of surfaces of diamond burnished components**
Gyula Varga and Viktória Ferencsik
- 7. Evaluation of ultrasonic dissimilar welds by ultrasonic testing immersion method c-scope mode**
Hamed Abdel-Aleem, Saad Khodir, Mohamed Newishy, Khalid Hafez and Morsy Amin Morsy
- 8. Forecasting of steel consumption with the use of nearest neighbors algorithm**
Michał Rogalewicz, Robert Sika, Paweł Popielarski and Grzegorz Wytyk

Session I

Room Emerson

S2: Additive Manufacturing and Non-traditional Technologies

Chairmen: Ian CAMPBELL, Petru BERCE

- 1. Concept Development of a New Lumbar Intervertebral Disk Implant**
Cristian-Vasile Doicin, Mihaela-Elena Ulmeanu, Alexa-Sorina Frîncu and Vlad-Cristian Enache
- 2. An experimental study on the dimensional accuracy of holes made by abrasive waterjet machining of Hardox steels**
Alexandru Catalin Filip, Laurentiu Aurel Mihail and Mircea Anton Vasiloni
- 3. Research regarding the manufacturing through AM technologies of an implant for cervical disc replacement**
Cristina Stefana Miron-Borzan, Emilia Sabau, Mircea Mera and Petru Berce
- 4. Comparison of the accuracy of 3D printed prototypes using the stereolithography(SLA) method with the digital CAD models**
Emil Yankov and Maria P. Nikolova
- 5. Optimized anodization setup for the growth of TiO₂ nanotubes on flat surfaces of titanium based materials**
Gabriela Strnad, Paul Chetan, Razvan Cazacu, Zoltan German-Sallo and Laszlo Jakab-Farkas
- 6. Effect of phosphate/fluoride electrolytes on mass and dimensional stability of electrochemical anodization bath manufactured by FDM**
Gabriela Strnad, Razvan Cazacu, Paul Chetan, Andrei Serban Gaz Florea and Ferencz Peti
- 7. Influence of the layer thickness in the fused deposition modeling process on the dimensional and shape accuracy of the upper teeth model**
Ján Milde, Ladislav Morovič and Jakub Blaha
- 8. The SLM technology on the way to industrial serial production**
Stephan Rit – SLM Solutions (Germany)

Session I

Room Destaco

S4: Automation of Manufacturing Systems and Assembly

Chairmen: Katarina MONKOVA, Adrian TRIF

- 1. The emotiv EPOC interface paradigm in human-computer interaction**
Dorina Ancau, Nicolae-Marius Roman and Mircea Ancau
- 2. Inference of power loss in spherical joints of the 6RSS parallel mechanism**
Gabriel Andrei and Lucian Milica
- 3. Advanced engineering design capabilities applied for developing a technological device for automated assembly**
Ionut Madalin Pista, Gheorghe Nagit, Vasile Merticaru and Marius Ionut Ripanu
- 4. Taxonomy of responsibility allocation in Human-Machine Systems with different levels of automation**
Marcin Butlewski
- 5. Using Virtual Reality tools to support simulations of manufacturing instances in Process Simulate: The case of an iCIM 3000 system**
Radovan Holubek, Daynier Rolando Delgado Sobrino, Peter Košťál, Roman Ružarovský and Karol Velisek
- 6. Novel trends in the assembly process as the results of human – the industrial robot collaboration**
Radovan Holubek, Roman Ruzarovsky, Daynier Rolando Delgado Sobrino, Peter Kostal, Karol Velisek and Adam Švorc
- 7. Using the modern CNC controllers capabilities for estimating the machining forces during the milling process**
Radu-Eugen Breaz and Sever-Gabriel Racz
- 8. Allowance treatment static designed couple and repeatable precision in assembly**
Štefan Václav, Jozef Jurko and Šimon Lecký
- 9. Simulation as a support tool in assembly systems planning**
Štefan Václav, Šimon Lecký, Katarína Senderská and Albert Mareš

Session II

Room A113

S1: Manufacturing Engineering

Chairmen: Peter MONKA, Dan LEORDEAN

- 1. Aspects regarding the surface roughness on a steel part cutted using AWJ technology**
Adrian-Paul Basarman and Mircea Lobonțiu
- 2. Considerations on studying the characteristics of the elastic axle steering system on railway vehicles**
Ioan Sebeșan, Sorin Arsene and Mircea Radu Sebeșan
- 3. Initial study on the state of the art solutions for the simulation of the thermoregulatory sweating conditions**
Ioan Turcin, Selver Softic, Udo Traussnigg and Adrian Trif
- 4. System for measurement of interaction forces between wheel and rail for railway vehicles**
Ion Manea, Ioan Sebesan, Mihai Gabriel Matache, Marius Ene and Sorin Arsene
- 5. Ergonomic solutions to support forced static positions during work**
Marcin Suszyński, Marcin Butlewski and Róża Stempowska
- 6. Selection of the method for the working time measuring in assembly process using fuzzy analytic hierarchy process**
Marcin Suszynski and Robert Cieslak
- 7. Verification of static strain and deformation of industrial robot actuator in ANSYS environment**
Marek Kočiško, Lukaš Blaško, Petr Baron and Dušan Paulišin
- 8. Research regarding the influence of execution, assembly and functioning errors on the profile changes of spur gear in front plane**
Mircea Mera and Cristina Stefana Miron-Borzan

Session II

Room Emerson

S2: Additive Manufacturing and Non-traditional Technologies

Chairmen: Andreas GEBHARDT, Stanislaw LEGUTKO

- 1. Basic design rules of unit cells for additive manufactured lattice structures**
Julia Kessler, Nicolae Balc, Andreas Gebhardt and Karim Abbas
- 2. Influence of the volume ratio of solid phase on carrying capacity of regular porous structure**
Katarina Monkova, Peter Monka and Jozef Tkac
- 3. Education technology to promote innovations: Teaching Additive Manufacturing based on a rolling Lab**
Laura Katharina Thurn, Nicolae Bâlc, Andreas Gebhardt and Julia Kessler
- 4. Additive manufacturing in maxillofacial reconstruction**
Luciana Laura Dinca, Alexandra Banu and Aurelian Visan
- 5. Implementation of additive technologies in primary education**
Melita Milić, Sven Maričić and Donald Radolović
- 6. Surface treatment of AISI316 high speed steel by laser melting**
Mohamed Newishy, Hamed Abdel-Aleem, Mohamed Rafat Elkousy, Abdel-Monem Elbatahgy and Iman El-Mahallawi
- 7. Investigations of surface topography of hot working tool steel manufactured with the use of 3D print**
Pawel Grobelny, Lukasz Furmanski and Stanislaw Legutko
- 8. Finite Element Analysis to determine the optimum contact pressure between the components of a hip implant made by using the Selective Laser Sintering and the Selective Laser Melting technologies**
Razvan Ioan Pacurar, Ancuta Carmen Pacurar and Anna Magdolna Petrilak
- 9. New Ways in metal 3D printing**
Ovidiu Crivac – NU Technologies (Romania)

Session II

Room Destaco

S5: Metal Forming

Chairmen: Laurențiu SLĂTINEANU, Lucian LĂZĂRESCU

- 1. Selected properties of laser cladding coatings shaped using Flowdrill technology**
Dariusz Bartkowski, Waldemar Matysiak and Aneta Bartkowska
- 2. Evaluation of deep drawing force under different friction conditions**
Lucian Lazarescu and Dorel Banabic
- 3. Surface roughness obtained at stamping of bearing cages**
Marius Ionut Ripanu, Gheorghe Nagit, Laurentiu Slatineanu, Oana Dodun and Andrei Marius Mihalache
- 4. Deformation prediction and Finite Element Analyses of precision seamless tubes during cold drawing**
Martin Necpal, Maroš Martinkovič and Ivan Buranský
- 5. Methodology supporting production control in a foundry applying modern DISAMATIC molding line**
Robert Sika and Paweł Popielarski
- 6. The lack of uniformity of the deformations and the degree of deforming in case of orbital deformation**
Sorin Dumitru Grozav, Gabriel Nicodim Ciusca and Vasile Ceclan
- 7. Selected properties of galvanic coatings shaped using thermal drilling technology**
Waldemar Matysiak, Dariusz Bartkowski and Aneta Bartkowska

Session III

Room A113

S1: Manufacturing Engineering

Chairmen: Alexandru CĂREAN, Ladislav MOROVIČ

- 1. Design of the clamping system for the CNC machine tool**
Miroslav Císar, Ivan Kuric, Nadežda Čuboňová and Matej Kandra
- 2. Determination of the industrial robot positioning performance**
Miroslav Císar, Vladimír Tlach, Ivan Kuric and Ivan Zajačko
- 3. Development of innovative 3D scanner for digitalization of hard to reach places**
Monika Teliskova, Jozef Torok, Marek Kocisko, Jaroslav Petrus and Jakub Kascak
- 4. Cold cracking in welding of ASTM A537 class 1 steel**
Morsy Abokhala
- 5. Nanostructure plasma spray coating of Cr₃C₂-Ni₂₀Cr powder compared with microstructure material**
Morsy Abokhala, Emad Elkashif, Ahmed Mohamed Akoush and Mohamed El Sayed Mohamed
- 6. Identification of detailed behaviour of Flexible Manufacturing Cell using Hierarchical Timed Coloured Petri Nets**
Sanjib Kumar Saren, Florin Blaga and Tiberiu Vesselenyi
- 7. State space properties of Flexible Manufacturing Cell based on Hierarchical Timed Colored Petri Nets**
Sanjib Kumar Saren, Florin Blaga and Tiberiu Vesselenyi
- 8. Simulation as a designed tool for material flow analysis by means of Witness Horizon**
Tomáš Vysocký, Marek Kočíško, Ľudmila Nováková-Marcinčinová and Ema Nováková-Marcinčinová

Session III

Room Emerson

S3: Machining Processes and Quality Assurance

Chairmen: Gheorghe OANCEA, Arik SADEH

- 1. Ergonomics requirements for exploitation of machine and technical equipment**
Adam Górný
- 2. Optimization of the surface roughness equation obtained by Al7136 end-milling**
Alina Bianca Pop and Mihail Aurel Titu
- 3. The conceptual framework for physical risk assessment in multi-purpose workplaces**
Andrzej Marek Lasota and Krzysztof Hankiewicz
- 4. Optimal production size with partially inspected batches**
Arik Sadeh and Cristina Feniser
- 5. SPH Simulation of single grain action in grinding**
Danuț Julean
- 6. Studies of the laser etching on painted plastic parts to prevent the risks of engraving failures at mechatronic devices**
Ion Cristian Braga, Anisor Nedelcu and Razvan Udroidu
- 7. Surface roughness evaluation after machining wear resistant hard coats**
Katarina Monkova, Peter Monka, Jiri Cesanek, Jan Matejka and Vladimir Duchek
- 8. Using the factorial experiment method to analyze the corrosion protection process**
Mihail Aurel Titu, Constantin Oprean, Alina Bianca Pop and Ștefan Țițu

Session III

Room Destaco

S6: CAD-CAM

Chairmen: Nicolae COFARU, Cornel CIUPAN

- 1. Experimental studies on manufacturing of the complex shapes made from copper**
Alina Ioana Popan, Bogdan Luca and Alexandru Carean
- 2. Using Auto-CAD environment to profile the revolution tools generating helical rotors with involute undercutting profiled lobes**
Camelia Lacramioara Popa and Viorel Popa
- 3. A new approach of the design process for replacing wooden parts of furniture**
Cornel Ciupan, Emanuela Pop, Ioan Filip, Emilia Ciupan, Emilia Campean, Ioan Cionca and Vasile Heres
- 4. Comparison of process documentation generation in PTC CREO and NX systems**
Martin Pollák, Petr Baron and Marek Kočiško
- 5. Studies on predictive virtual models based on finite element analysis of the behavior of geomembranes**
Petre Vasiluta, Nicolae Florin Cofaru and Ileana Ioana Cofaru
- 6. Software tool used for automated design of customizable product**
Roxana Pescaru, Panagiotis Kyratsis and Gheorghe Oancea
- 7. Performance and Limits of High-Dynamic Milling Processes based on Trochoidal Tool Paths**
Stefan Hesterberg and Bernd Albert
- 8. Low-cost industrial photogrammetry for rapid prototyping**
Vlad Bocanet, Marius Bulgaru and Vlad Pop

Session IV

Room A113

S7: Environmental Engineering

Chairmen: Mihai BĂNICĂ, Răzvan PĂCURAR

- 1. Silver Nanoparticles (AgNP) impregnated filters in drinking water disinfection**
Alexandru Rus, Dan Leordean and Petru Berce
- 2. The study of postural workload in assembly of furniture upholstery**
Andrzej Marek Lasota and Krzysztof Hankiewicz
- 3. Textile clothing clever applied to obtain LED**
Elena Rotari, Corina Negara and Arcadii Boldescu
- 4. Open innovation in Cluj-Napoca IT brands**
Ligia Maria Nan, Roxana Lavinia Păcurariu and Laura Bacali
- 5. Impact of environmental conditions on the reliability of MEMS components from optical applications**
Marius Pustan, Corina Birleanu and Florina Șerdean
- 6. An innovation diffusion model for new mobile technologies acceptance**
Nadia Barkoczia, Elena Simina Lakatos and Laura Andrada Bacali
- 7. Full Factorial DOE to determine and optimize the equation of impact forces produced by water jet used in sewer cleaning**
Nicolae Medan, Mihai Banica and Sandor Ravai Nagy
- 8. Analytical inventory of process variables for sustainable development of a small business for integrated production of wood pellets**
Vasile Merticar, Bogdan Rusu and Romeo-Mihai Ciobanu

Session IV

Room Emerson

S3: Machining Processes and Quality Assurance

Chairmen: Mihail Aurel ȚÎȚU, Marian BORZAN

- 1. Multi-objective optimization of single pass turning using performance diagrams**
Miroslav Radovanovic
- 2. Research on influence of gear parameters on noise, vibrations and harshness conditions for automatic transmissions run-off cycle**
Nelu Pascalau, Ioan Vuscan and Nicolae Panc
- 3. Measuring the roundness deviation in the v-block measurement method**
Pavlina Toteva-Lyutova and Dimka Vasileva
- 4. A case study about acquisition of mechanically fixed cutting inserts**
Raluca Daicu, Ditu Valentin and Gheorghe Oancea
- 5. Tracking of the development wear of cutting tools with different geometry during parting-off**
Robert Čep, Šárka Malotová, Tomáš Zlámal, Vladimír Vrba and Marian Borzan
- 6. Aspects of design of experiments on machining technology by forming the internal threads**
Sandor Ravai Nagy, Nicolae Medan and Ferenc Szigeti
- 7. The analysis of instantaneous tool displacements during precise ball end milling**
Szymon Wojciechowski
- 8. The influence of hole finishing strategies on quality**
Vlad Bocanet and Nicolae Panc

Session IV

Room Destaco

S8: Processes of Plastics and Composite Materials

Chairmen: Liana HANCU, Paul BERE

- 1. Humidity influence on the adhesion of SU-8 polymer from MEMS applications**
Corina Birleanu, Marius Pustan, Florina Serdean, Rodica Voicu and Violeta Merie
- 2. Characterization of a thermoforming composite material made from hemp fibers and polypropylene**
Emilia Ciupan, Lucian Lazarescu, Ioan Filip, Cornel Ciupan, Emilia Campean, Ioan Cionca and Emanuela Pop
- 3. Mechanical behavior of composite materials using the finite element analysis**
Emilia Sabau, Adrian Popescu and Cristian Vilau
- 4. Proposal for a composite structure and graphic design for a parking barrier**
Liana Hancu, Gabriel Marc, Adrian Popescu, Paul Bere and Simona Rodean
- 5. Characterization Polyethylene terephthalate (PET) nanocomposites mixing with nanosilica and titanium oxide**
Mircea Rusu, Dan Leordean, Cosmin Cosma, Miuta Filip, Marioara Moldovan, Laura Silaghi-Dumitrescu and Olga Hilda Orasana
- 6. Carbon epoxy front hood for an electrical city vehicle**
Paul Bere, Calin Neamtu, Cristian Dudescu, Radu Comes and Sergiu Solcan

