BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period – BRIGHT

2020-1-RO01-KA226-HE-095517

Assoc. Prof.dr.eng. Razvan Pacurar

Department of Manufacturing Engineering,

Faculty of Industrial Engineering, Robotics & Production Management, TUCN, RO

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

BRIGHT

Co-funded by the Erasmus+ Programme of the European Union

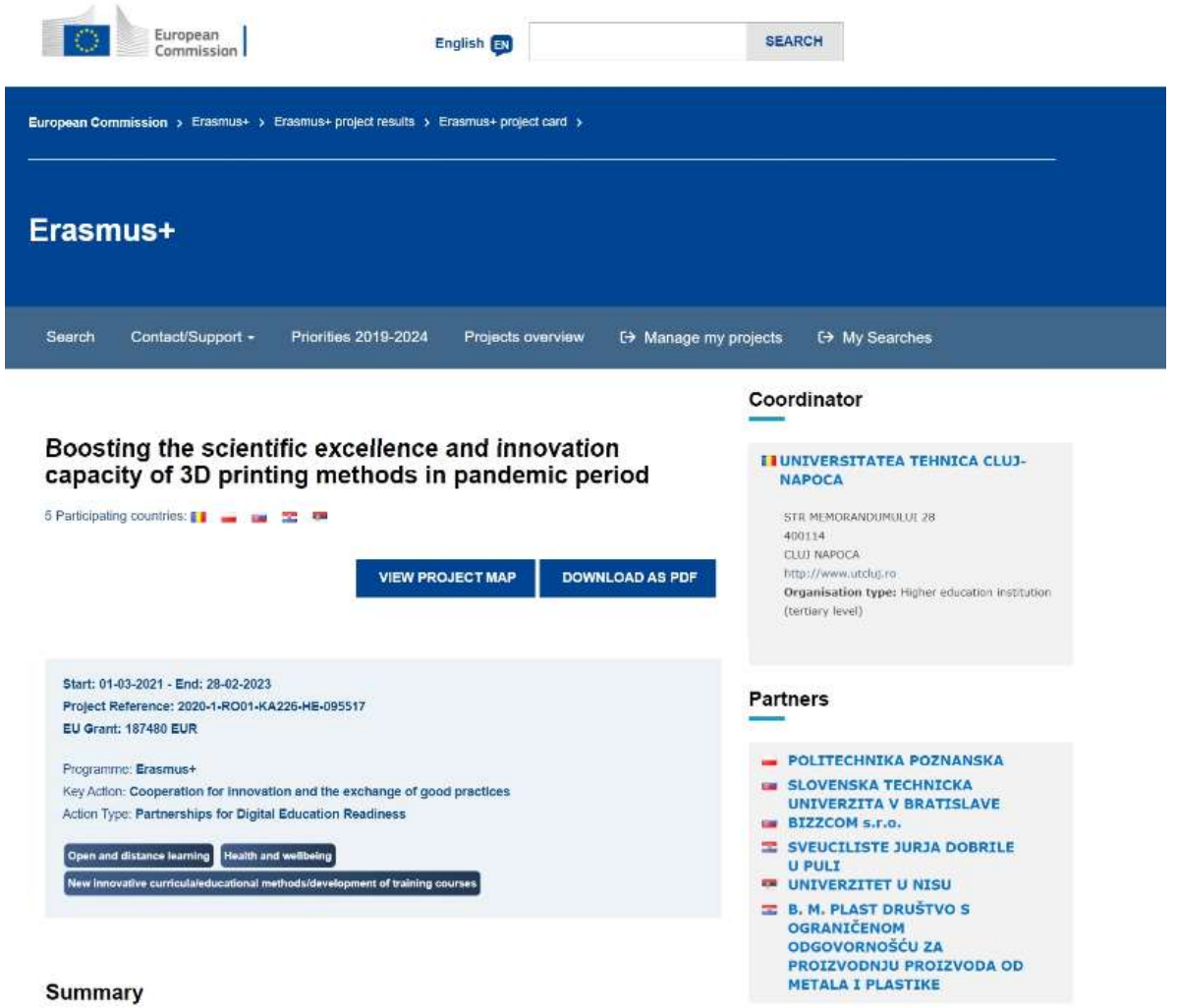
Erasmus+ KA 226 project for Higher Education =strategic partnership for Digital Education=

Total Budget: 187.480 EUR

Total Duration: 2 years

Starting date: 31.03.2021

Ending date: 28.02.2023


European Commission

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Erasmus+

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Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

5 Participating countries:

VIEW PROJECT MAP | DOWNLOAD AS PDF

Start: 01-03-2021 - End: 28-02-2023
Project Reference: 2020-1-RO01-KA226-HE-095517
EU Grant: 187480 EUR

Programme: Erasmus+
Key Action: Cooperation for innovation and the exchange of good practices
Action Type: Partnerships for Digital Education Readiness

Open and distance learning | Health and wellbeing
New innovative curricula/educational methods/development of training courses

Summary

Coordinator

UNIVERSITATEA TEHNICA CLUJ-NAPOCA
STR MEMORANDUMULUI 28
400114
CLUJ NAPOCA
http://www.utcluj.ro
Organisation type: Higher education institution (tertiary level)

Partners

POLITECHNIKA POZNANSKA
SLOVENSKA TECHNICKA UNIVERZITA V BRATISLAVE
BIZZCOM s.r.o.
SVEUCILISTE JURJA DOBRILE U PULI
UNIVERZITET U NISU
B. M. PLAST DRUŠTVO S OGRANIČENOM ODGOVORNOŠĆU ZA PROIZVODNJU PROIZVODA OD METALA I PLASTIKE

Coordinator

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA — TU Cluj-Napoca (RO)

Partners from Higher Education institutions

Univ of Nis (SRB)

Poznan Univ of Technology (PL)

STU Bratislava (SK)

Juraj Dobrila Univ (HR)

bm plast (HR)

bizzcom (SK)

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA | STU | bizzcom | bm plast

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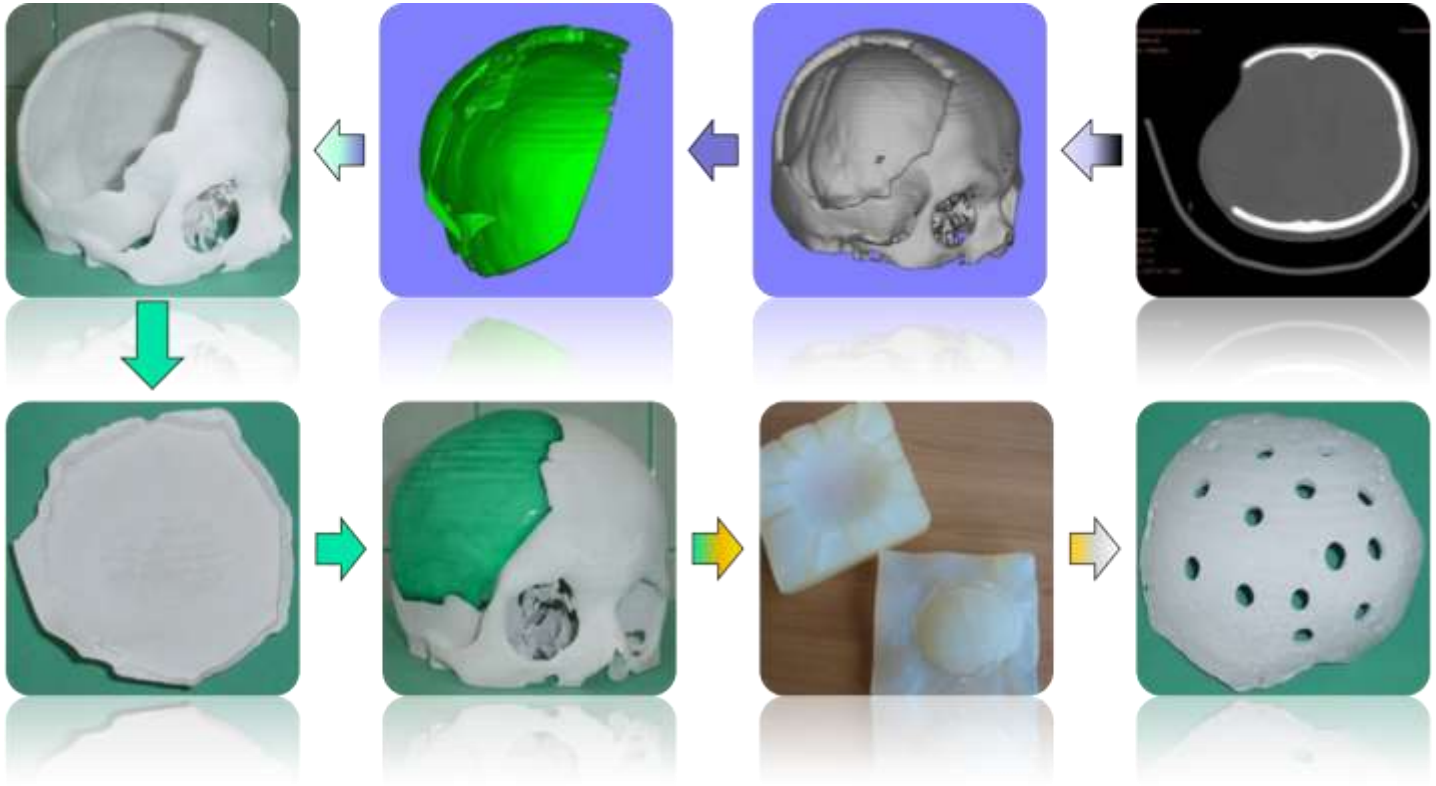
First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)



Medical applications – National Research grant – CEEX – 2005-2008 (Department of Manufacturing Engineering, TUCN)

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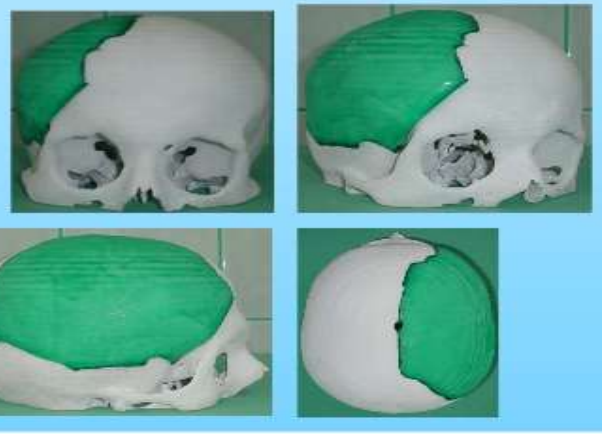
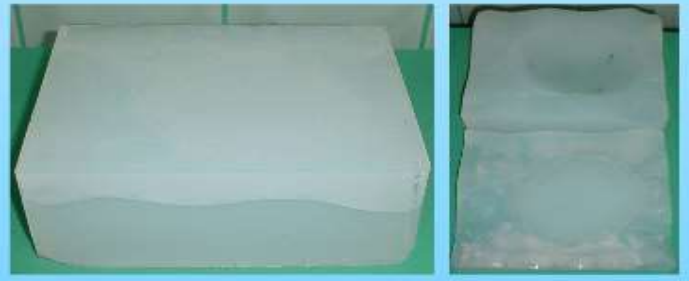
of the European Union

First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)

The master model, made at DME - TUCN

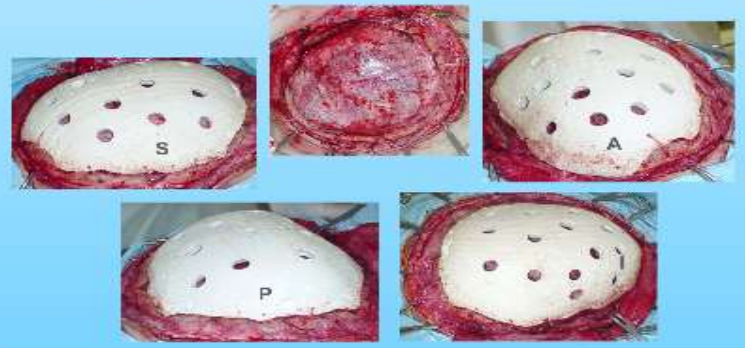


Vacuum casting of the silicone rubber moulds, made at DME - TUCN

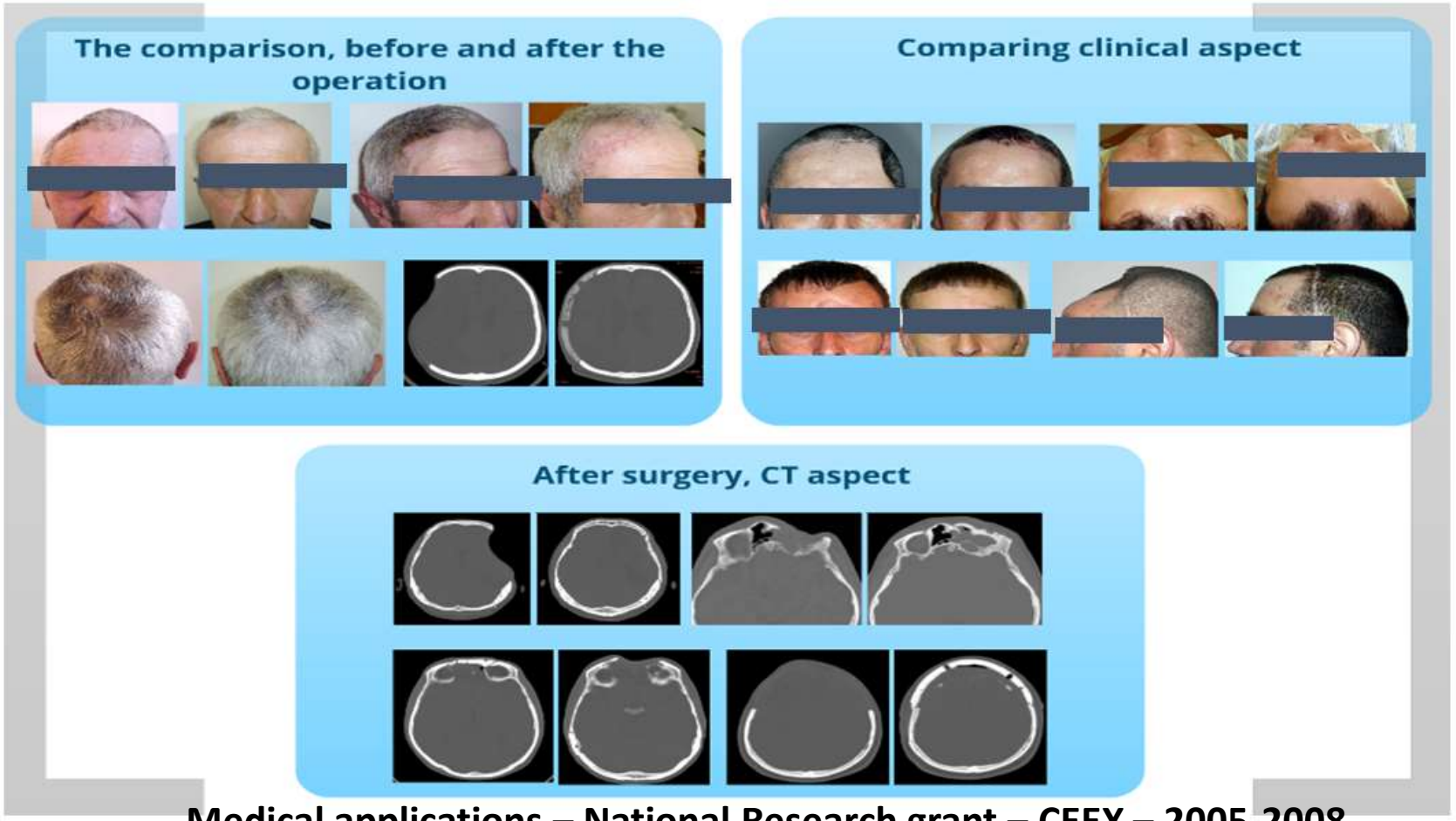


Finishing and milling the implant

Fixing the implant – surgical operation



First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)



Medical applications – National Research grant – CEEX – 2005-2008 - (Department of Manufacturing Engineering, TUCN)

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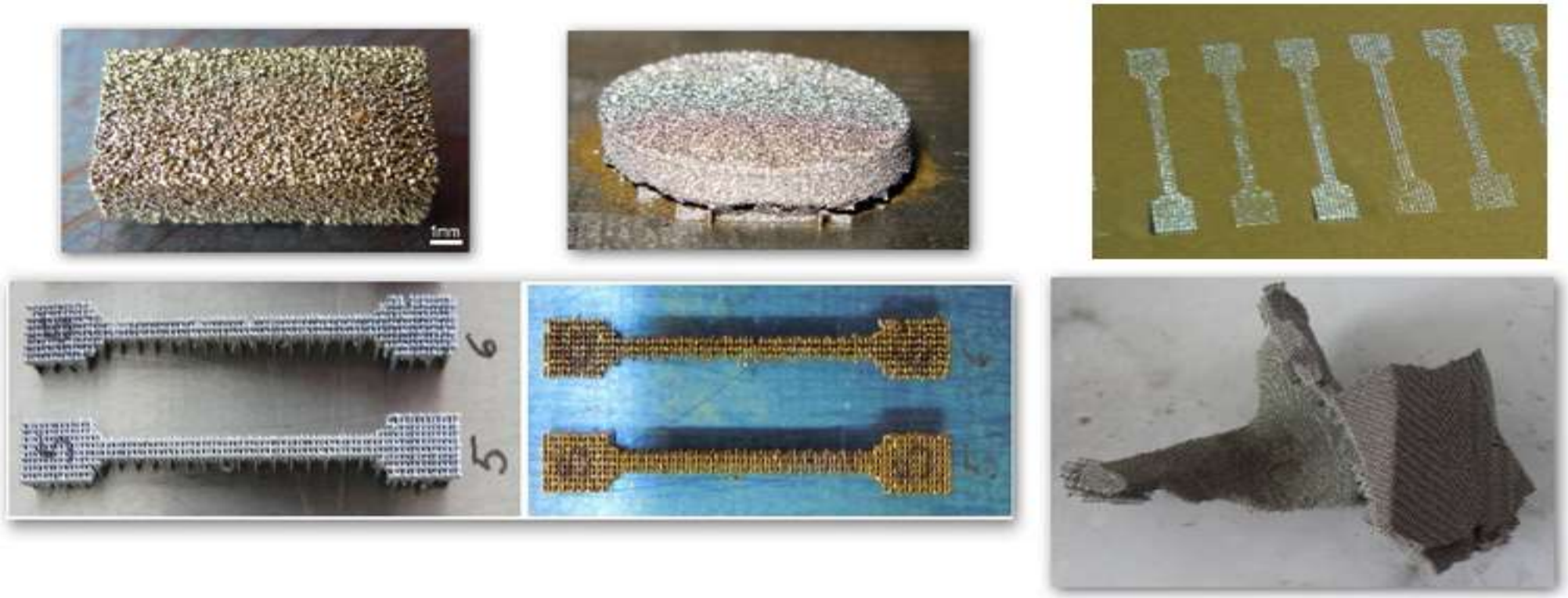
of the European Union

First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)



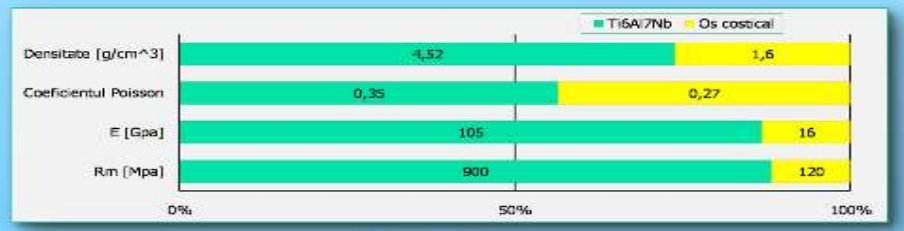
Medical applications – National Research grant – PCCE - BIOMAPIM – 2010-2013
- (Department of Manufacturing Engineering , TUCN)

First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)

Comparison between the mechanical characteristics of the cortical bone and Ti6Al7Nb

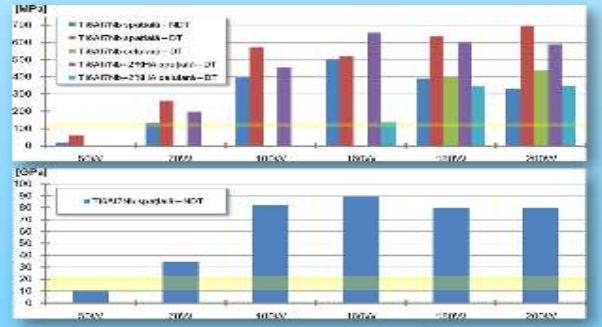
	Al	Nb	Ta	Fe	O	C	N	H	Ti
Min [%]	5,5	6,5	-	-	-	-	-	-	88,0
Max [%]	6,5	7,5	0,50	0,25	0,20	0,08	0,05	0,009	84,9

Caracteristica	T_t [°C]	T_s [°C]	Densitatea [g/cm³]	Rm [MPa]	$R_{p0,2}$ [Pa]	A [%]	E [GPa]	Coeficientul Poisson
Valoarea	1538-1649	1010±15	4,52	900	800	10	105	0,33-0,37



Experimental SLM research at DME

Mechanical characteristics



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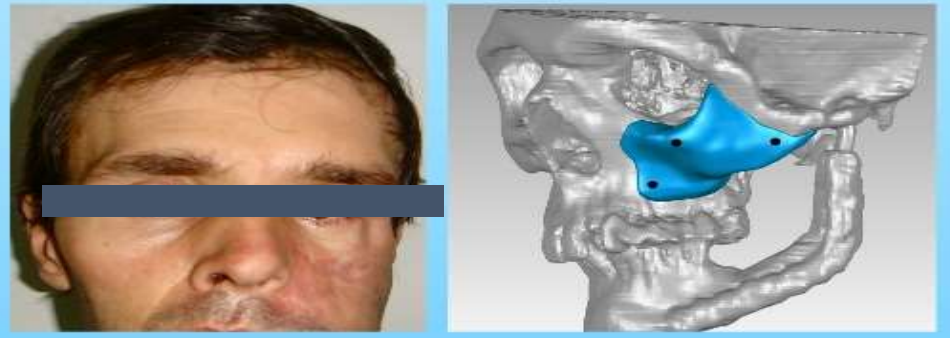
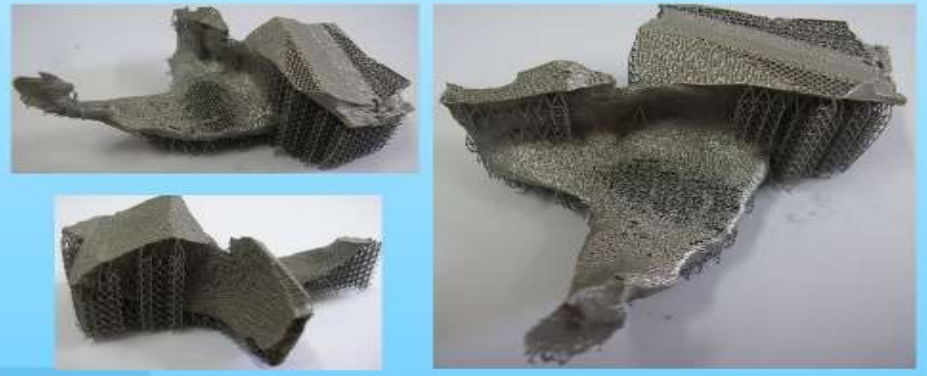
First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)

First surgical operation made in Romania, using a metal implant made by SLM



Titanium implants made by SLM at DME-TUCN



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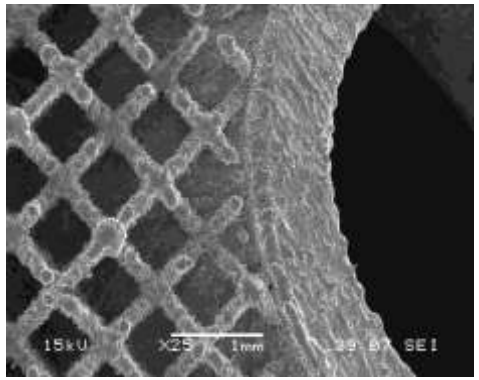
First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)

Manufactured area	Scanning strategy	Laser power[W]	Scanning speed[mm/s]	Layer thickness [µm]
Implant supports	Hatch Solid	100	505	30
Solid areas	Stripes with skin	100	550	30
Porous structure	Stripes with skin	175	470	30



Customized medical implant made at SLM Solutions GmbH in Lubeck, Germany, using SLM 250 HL equipment

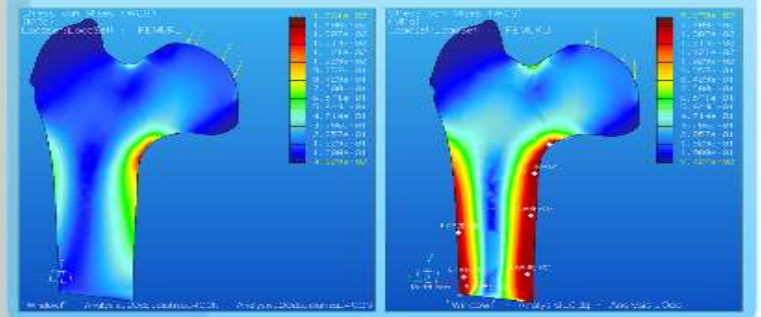
Co-funded by the Erasmus+ Programme of the European Union

First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)

Controlling porosity by the process parameters

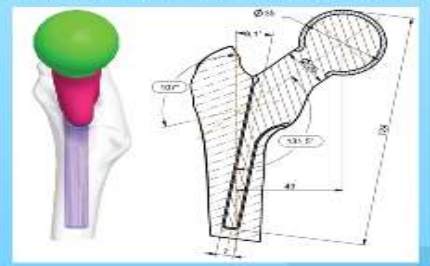
Samples made out of Ti based materials, with 0.6 mm hatching distance on X and Y

Stresses from the femur section, under 400 N force load



Multistructured endo-prothesys – structure distribution. Geometrical characteristics

- magenta – 50W, red – 70W, green – 100W
- Solution with redesigned insert – multistructured endoprothesys
- Considered materials – structures made with 50W, 70 W and 100 W



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First step in writing a success proposal
scientific background (strong elements) - previous experience (research projects)

Medical applications – National Research grant – PCCE - BIOMAPIM – 2010-2013- (Department of Manufacturing Engineering , TUCN)

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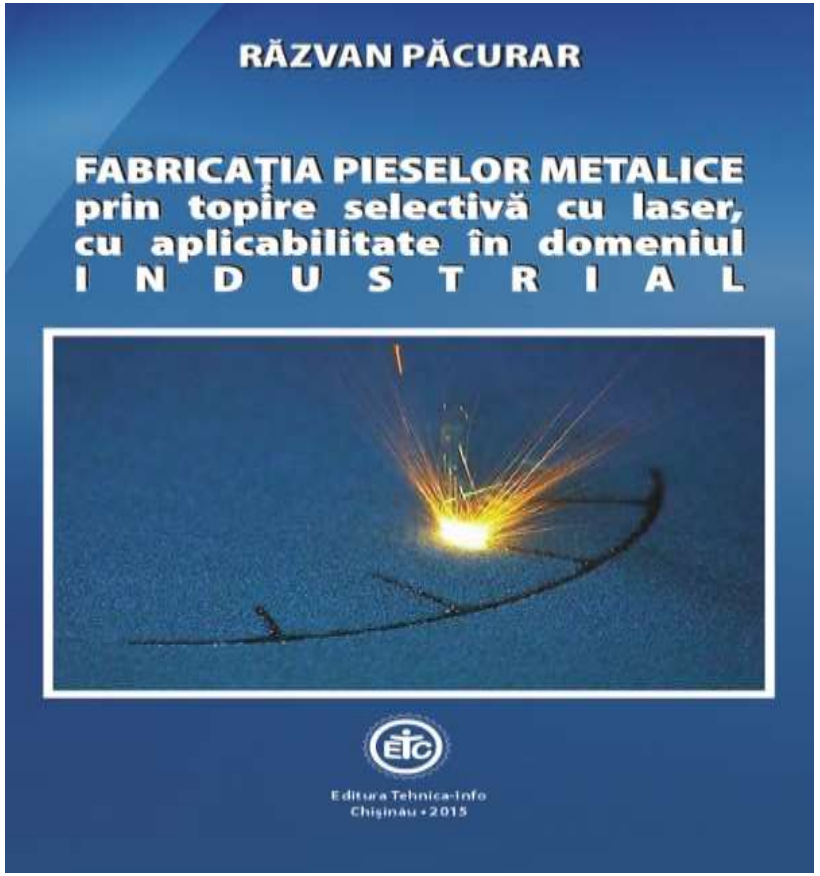
First step in writing a success proposal
scientific background (strong elements) - previous experience
(books published in the field of the proposal)



Books / chapters of books published related to research developed in the field of AM technologies

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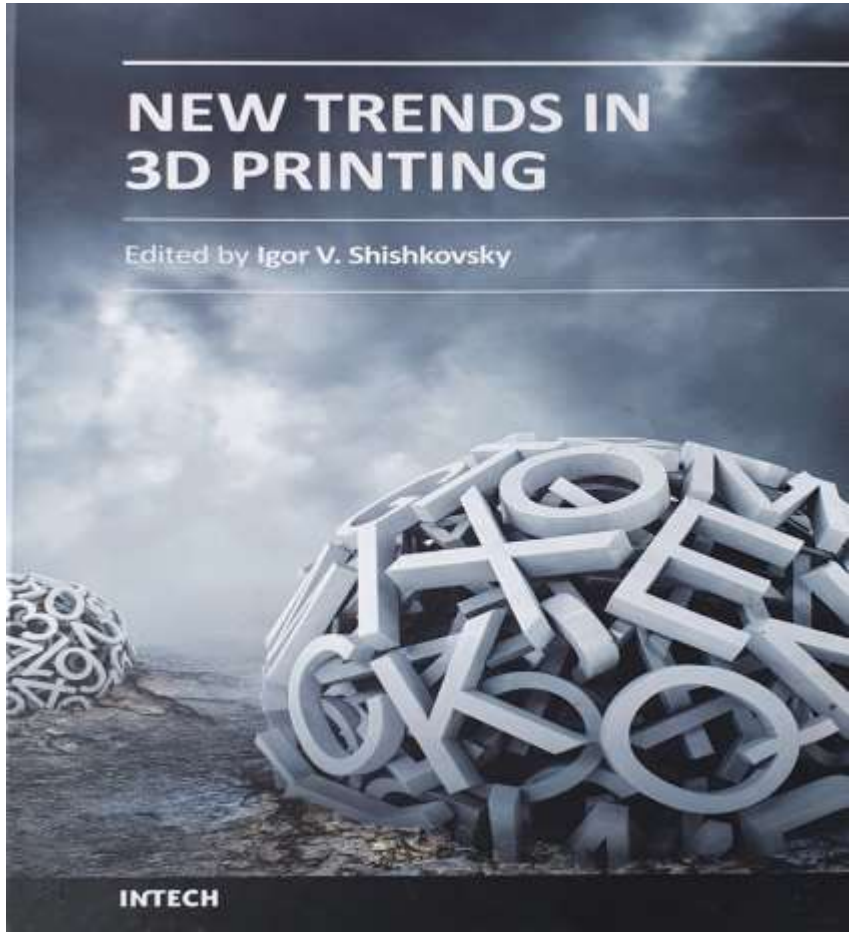
First step in writing a success proposal
scientific background (strong elements) - previous experience
(books published in the field of the proposal)



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First step in writing a success proposal
scientific background (strong elements) - previous experience
(scientific prizes and awards in the field of project proposal)

Co-funded by the Erasmus+ Programme of the European Union

Premii ale Academiei Romane decernate in anul 2017

Premii ale Academiei Romane pe anul 2015 decernate in anul 2017

In domeniul Stiintelor Tehnice

Premiul **HENRI COANDĂ**
Lucrarea: Aplicaţiile medicale ale tehnologiilor de fabricaţie prin adăugare de material
- autori : Petru Berce, Nicolae Bâlc, Dan Leordean, Cristina Borzan, Horea Chezan, Voicu Mager şi Cristian Berce

Supporting letters from the major stakeholders in the field of project application

Co-funded by the Erasmus+ Programme of the European Union

ROMANIA
CITY OF CLUJ-NAPOCA
MAYOR'S OFFICE
3 Moților Str., 400001, Cluj-Napoca,
email: cabinet@primariaclujnapoca.ro; telephone: +40 264 591 273; fax: +40 264 599 329
www.primariaclujnapoca.ro | www.clujbusiness.ro | www.visitclujnapoca.ro

No.512057/105/19.10.2020

Cluj-Napoca, October 19th, 2020

Dear Associate Professor Răzvan Păcurar,

The purpose of this letter is to express our support for the project proposal entitled "BRIGHT: Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period" that is prepared for the program Erasmus+ Partnerships for Digital Education Readiness in the field of Higher Education (KA226-HED).

The topics of the BRIGHT project are of great interest for our entire community in the context of the CoVID 19. We are convinced that the proposed project can contribute in establishing strategic partnerships not only in teaching and training activities on-line for the students, but also in finding innovative methods to support hospitals and local community in joining our efforts in fighting against the CoVID 19.

Based on this aspects, we hereby wish to express our endorsement of the project entitled "BRIGHT: Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period" and we wish to express our institutional support in promoting and sustaining the aims and objectives of the BRIGHT project on local community level, so as the solutions proposed by the BRIGHT project could be used and implemented in saving lives of patients, especially in crisis periods caused by CoVID 19.

In addition, we will be glad, if it results necessary, to discuss any other possible ways of cooperation in this regard.

Yours sincerely,

Emil Boc
Mayor of Cluj-Napoca City

FLEGO. VALTER

Dear Associate Professor Razvan Pacurar,

The purpose of this letter is to express our support for the project proposal entitled **"BRIGHT: Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period"** that is prepared for the program Erasmus+ Partnerships for Digital Education Readiness in the field of Higher Education (KA226-HED).

The topics of the BRIGHT project are of great interest for our entire community in the context of the CoVID 19. We are convinced that the proposed project can contribute in establishing strategic partnerships not only in teaching and training activities on-line for the students, but also in finding innovative methods to support hospitals and local community in joining our efforts in fighting against the CoVID 19.

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In addition, we will be glad, if it results necessary, to discuss any other possible ways of cooperation in this regard.

Yours sincerely,

Valter Flego
Member of the European Parliament

Local office of MEP
Giardini 2, 52100 Pula

16/10/2020

TRANSILVANIA IT CLUSTER

Str. Dimitrie Cantemir 1
400067 Cluj-Napoca, Romania
www.transilvaniait.ro contact@transilvaniait.ro
Bianca Muntean@transilvaniait.ro

Cluj-Napoca, 12.10.2020

To:

Assoc.Prof. PhD Razvan Pacurar

Manufacturing Engineering Department

Technical University of Cluj-Napoca

B-dul Muncii, no. 103-105, 400641

e-mail: razvan.pacurar@tcm.utcluj.ro

In support for the BRIGHT Project Proposal

Dear Assoc. Professor Razvan Pacurar,

After being acquainted with the information provided by you, I hereby endorse the project proposal **"BRIGHT: Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period" coordinated by TUCN – Technical University of Cluj-Napoca**, Romania, for the program **Erasmus+ Partnerships for Digital Education Readiness in the field of Higher Education (KA226-HED)**.

I confirm that the aforementioned project proposal provides topics of interest for our activity and we will try to support the project by:

- Attending webinars, workshops, seminars and demos
- Participating in dissemination of project results.

In addition, we will be glad, if it is necessary, to discuss any other possible ways of cooperation in this regard. Please, do not hesitate to contact me if you have any questions or concerns.

Yours sincerely,

Bianca Muntean

Cluster Manager Transilvania

ROMANIA - MINISTERUL EDUCAȚIEI, CERCETĂRII ȘI INOVĂRII
UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE "IULIU HAȚIEGANU" CLUJ-NAPOCA

FACULTATEA DE MEDICINĂ
DEPARTAMENTUL MEDICINĂ COMUNITARĂ

DISCIPLINA SĂNĂTATE PUBLICĂ ȘI MANAGEMENT
400083 Cluj-Napoca, România
Str. Avram Iancu nr. 31, et. 3
Tel: +40 264 414566
www.umfcluj.ro

UMF
UNIVERSITATEA DE MEDICINĂ ȘI FARMACIE IULIU HAȚIEGANU CLUJ-NAPOCA

Cluj-Napoca, September 2020

Letter of support

The purpose of this letter is to express our full support for the project entitled **"BRIGHT: Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period" coordinated by TUCN – Technical University of Cluj-Napoca**, Romania, for the program **Erasmus+ Partnerships for Digital Education Readiness in the field of Higher Education (KA226-HED)**.

We are very interested about this topic in the context of the pandemic, since we really believe that the use of 3D printing solutions to produce parts that can be used in the hospitals for saving lives of the patients is a reliable one and could be used for producing parts that are vital in the context of the pandemic, especially in crisis periods, when the situations in hospital is really critical.

In this sense, we express our fully support for the **BRIGHT: Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period"** project **coordinated by TUCN** and we are convinced that the proposed project can contribute to the establishing of strategic partnerships between our institutions, in joining all our efforts for solving medical difficult issues related to the context of the pandemic.

We definitely consider this project as part of our strategy for developing of products, testing of new materials or equipment items for the medical sector, designing and testing of new products by 3D printing or producing parts that are needed especially in emergency situations and can be produced by 3D printing technologies in pandemic.

We confirm that the aforementioned project proposal provides definitely topics of high interest for our Institution and we will do all of our best to support and be actively involved in the BRIGHT project.

Yours sincerely,

Prof. Univ. Dr. Borzan Cristina

BRIGHT

Co-funded by the Erasmus+ Programme of the European Union

Main objectives and expected outcomes of the BRIGHT project

Providing **teaching resources and methods for professors** coming from the Higher Education institutions that are interested to find ways in providing their **students** relevant knowledge, skills and competences in the field of **3D printing methods used for producing medical parts in pandemic period**, comprised in:

- BRIGHT support e-courses related to the objective (based on one curriculum defined by the BRIGHT consortium in preamble)
- BRIGHT e-toolkit manual for digital learning (correlated with the support courses)
- BRIGHT e-learning virtual laboratory platform for developing, producing and testing of medical parts made by 3D printing (in correlation with the support courses and the toolkit)
- BRIGHT e-learning webinars on the use of 3D printing technologies in development, producing and testing of medical parts in pandemic period (video that shows in details all stages that are required to be fulfilled in the Rapid product development of a medical part by 3D printing (the videos are correlated with the support courses, toolkit and examples provided for teaching purposes on the e-virtual laboratory platform)
- BRIGHT e-case studies for project based learning method used in developing, testing and manufacturing of new medical products by 3D printing technologies in pandemic period (case studies are launched on the e-platform of BRIGHT project so professors and students can use the resources provided so far (i-iv) for developing, producing and testing of medical parts that are coming from medical sector, in cooperation with BRIGHT consortium and support of the SMEs)

The advantages of the BRIGHT methods will be that the **professors and students will gain knowledge and competences related to the developing, designing, producing by 3D printing methods and testing of medical products that are aimed to support medical institutions in the context of the pandemic.**

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BRIGHT

Co-funded by the Erasmus+ Programme of the European Union

Quick overview of the Intellectual outputs related to the BRIGHT project

IO1 - BRIGHT e-learning support courses for curriculum aiming to boost the scientific excellence and innovation of 3D printing methods used for developing and producing medical parts in pandemic period (Prof. Milos Simonovic, University of Nis, Serbia)

IO2 - BRIGHT e-toolkit manual for digital learning in producing medical parts by 3D printing methods in the context of the pandemic (Assoc. Prof. Răzvan Păcurar, TUCN, project manager)

IO3 - BRIGHT e-learning virtual laboratory platform for boosting the scientific capacity and innovation in teaching processes related to medical parts made by 3D printing methods in pandemic period (Assoc. prof. MSc. Eng. Peter Koštál, STU Bratislava)

IO4 - BRIGHT e-learning webinars on the use of 3D printing technologies in development, testing and producing of medical parts in pandemic period (Prof.dr.eng. Remigiusz Łabudzki, Technical Univ. of Poznan, Poland)

IO5 - BRIGHT e-case studies for project based learning method used in developing, testing and manufacturing of new medical products by 3D printing technologies in pandemic period (Assoc. Prof. Sven Maricic, University of Juraj Dobrila, Croatia)

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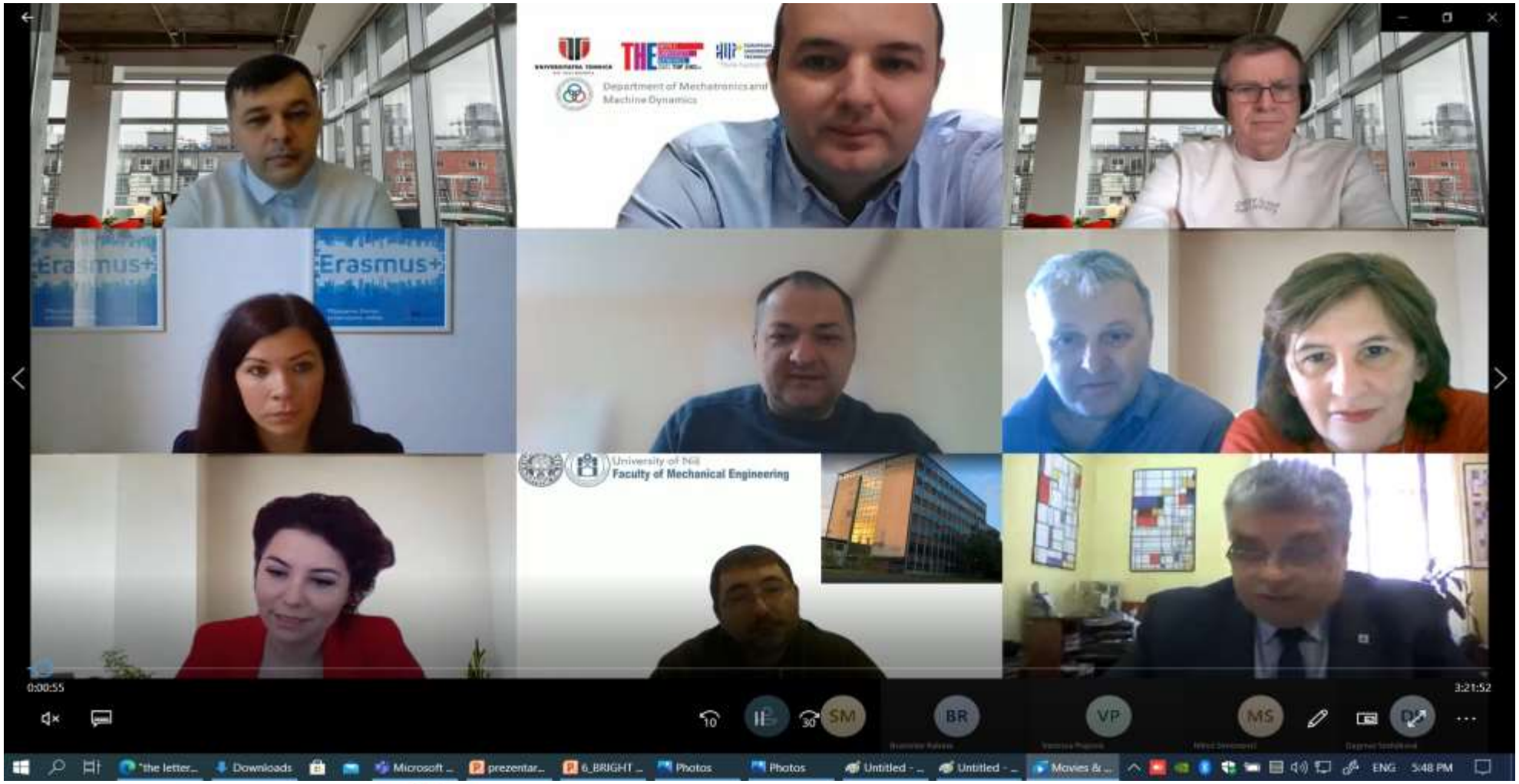
BRIGHT – Kick off meeting – 19.03.2021 – TUCN, RO



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BRIGHT

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BRIGHT – Kick off meeting – 19.03.2021 – TUCN, RO

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Quick overview of the Intellectual outputs related to the BRIGHT project

Co-funded by the Erasmus+ Programme of the European Union

IO1 - BRIGHT e-learning support courses for curriculum aiming to boost the scientific excellence and innovation of 3D printing methods used for developing and producing medical parts in pandemic period (Prof. Milos Simonovic, University of Nis, Serbia)

Starting: **1.03.2021**

Open access on the Platform?

Template?

Content?

Reports?

Deadline: **31.07.2021**

1. CAD	**Univ. of Poznan**
2. CAE	**TUCN & University of Nis**
3. Materials Science and Strength of Materials	**Univ. of Poznan & Univ Juraj Dobrila**
4. Flexible manufacturing systems	**STU Bratislava**
5. 3D printing and Rapid Tooling methods for medicine	**TUCN & University of Nis**
6. Process optimization and software control	**University of Nis**
7. Medical Engineering standards and tests	**Univ Juraj Dobrila**

For each module according to the skills and competences of the BRIGHT partners consortium, from the **Technical team there will be nominated 1-2 responsible persons** which will be in charge with one module and will need to provide course support for the particular module related to 3D printing methods and the particular applications of these technologies for producing medical parts / testing of new materials, etc.

BRIGHT International Summer School – TUCN – 19 -31.07.2021

Co-funded by the Erasmus+ Programme of the European Union

1. CAD
2. CAE
3. 3D printing and Rapid Tooling methods for medicine
4. Process optimization and software control
5. Materials Science and Strength of Materials
6. Flexible manufacturing systems
7. Medical Engineering standards and tests
8. Virtual / augmented reality (VR / AR) experience
9. 3D printing companies presentations / 3D printing experience
10. Medical institutions presentations (about needs in pandemic)
11. Game on competition
12. Bright challenge debate
13. Virtual tours / visits
14. Round tables with experts coming from engineering / industrial / medical sectors

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BRIGHT International Summer School – TUCN – 19 -31.07.2021

https://bright-project.eu/

Highly intense program but with many achieved goals for the BRIGHT project

BRIGHT International Summer School – TUCN – 19 -31.07.2021

Big thank to all the participants to the BRIGHT International Summer School 2021 edition

BRIGHT International Summer School KPIs

WOW! 350 participants from more than 20 countries registered!!!

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STU SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA
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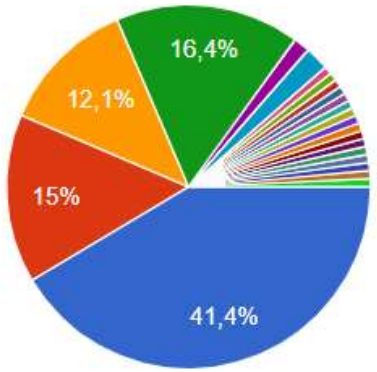
BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Fulfilling of BRIGHT questionnaire on the BRIGHT project website

Specialization

140 de r 133 insuri



- Manufacturing Engineering / Industrial...
- Mechatronics and Robotics
- Mechanical / Bio-Mechanical Engineer...
- Medical Engineering
- Medicine
- Biomedical Engineering
- Regenerative and Biopharmaceutical...
- Microelectronics and nanotechnology
- Computer Science
- Computer Science and Automation
- Material Engineering
- Material Science
- Electrical engineering
- High school student
- Biomedical Engineering
- Industrial design
- Economics and Business
- Biochemistry
- Junior Survey Engineer
- Material science
- Chemical and processing engineering
- biomedical engineering

Specializations of BRIGHT International Summer School 2021 participants

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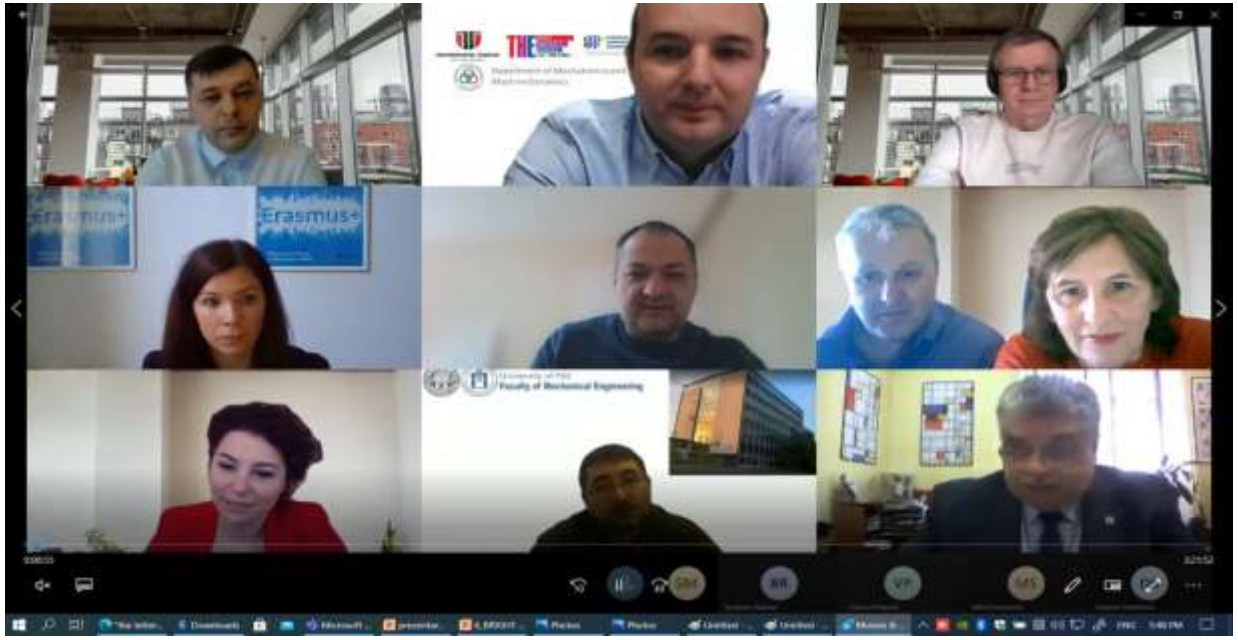
1st week progress – Opening ceremony

Opening ceremony



Project and partners' presentation

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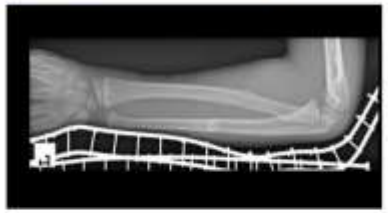
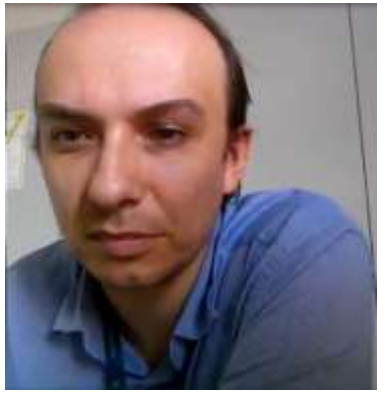
Presentation of the course modules that were prepared for IO1 which was ending in 31.07.2021



Janek and his fancy 3D printed broken arm stabilizer
3 iterations in 3 days!



CAD module held by Prof. Filip Gorski, Univ of Poznan, PL

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Presentation of the course modules that were prepared for IO1 which was ending in 31.07.2021

CAE module held by Associate Prof. Razvan Pacurar, TUCN, RO

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Presentation of the course modules that were prepared for IO1 which was ending in 31.07.2021

3D printing and Rapid Tooling module held by Associate Prof. Razvan Pacurar, TUCN, RO

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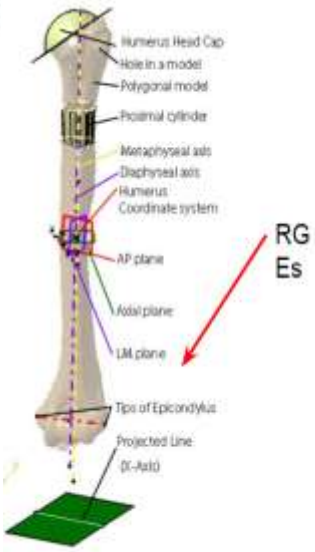

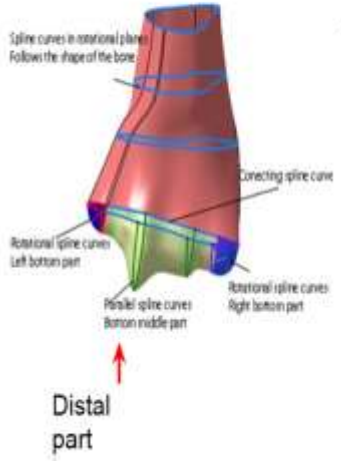

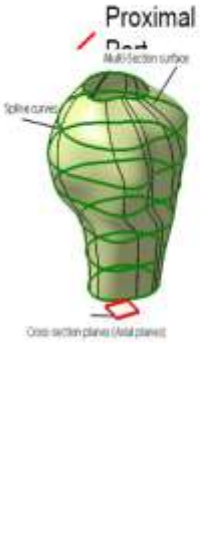

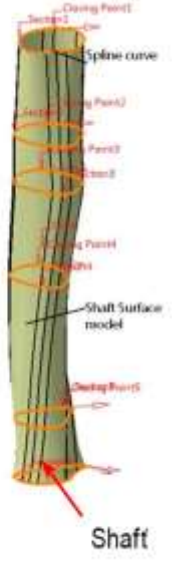

Process optimization and software control module held by Associate Prof. Nikola Vitkovic, Univ. of Nis, SRB

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Materials Science and Strength of Materials in medicine

Remigiusz ŁABUDZKI, PhD Eng (remigiusz.labudzki@put.poznan.pl),
Faculty of Mechanical Engineering
POZNAN UNIVERSITY OF TECHNOLOGY
POLAND

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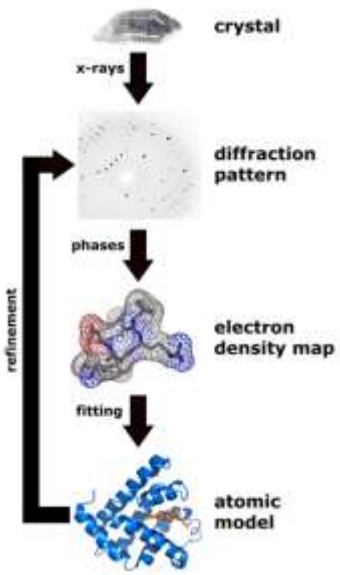

Materials Sience and Strength of Materials held by Prof. Remigiuzs Labudski, Univ of Poznan, PL

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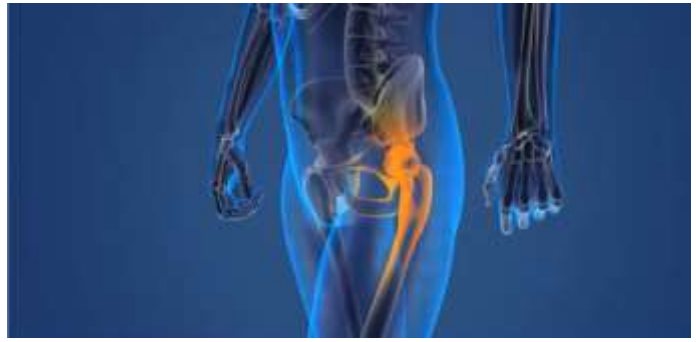

Flexible manufacturing systems in medical applications module held by Prof. Peter Kostal, STU Bratislava, SK

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Presentation of the course modules that were prepared for IO1 which was ending in 31.07.2021

Medical engineering and test module held by Prof. Sven Maricic, Univ. of Juraj Dobrila, Istria, HR

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BRIGHT International Summer School on:

3D printing for medical applications

Beside modules related to IO 1 – other lectures related to the topic of the BRIGHT International Summer school were held by colleagues of the BRIGHT consortium, but also out of the consortium (with open access / free of charge)

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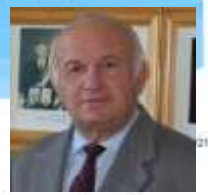
Lectures and presentations held by other participants at BRIGHT event

Applications of 3D printing in medicine, developed within the National Centre of Innovative Manufacturing (TUCN)

Nicolae Balc, Petru Berce, Mihaela Băciuţ, Grigore Băciuţ, Horaţiu Rotar, Cristian Dinu
Horea Chezan, Răzvan Păcurar, Dan Leordean, Cosmin Cosma, Paul Bere, Mihaela Hedeşiu, Avram Manea, Sebastian Stoia, Tiberiu Tamaş, Mădălina Lazăr



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Reverse engineering in medical applications

Lect. Eng. Stefan BODI, Ph.D.
stefan.bodi@muri.utcluj.ro

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Lectures and presentations held by other participants at BRIGHT event

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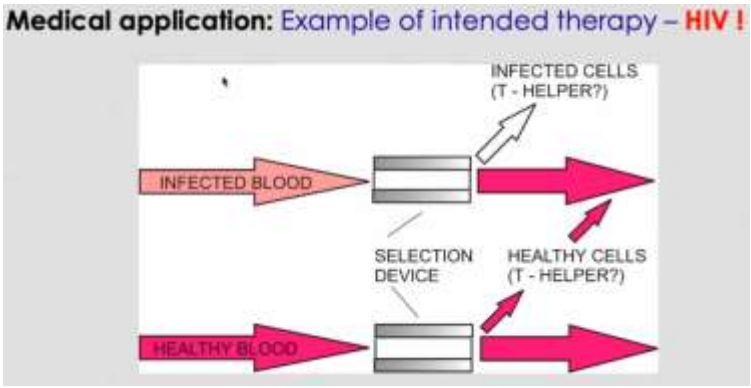

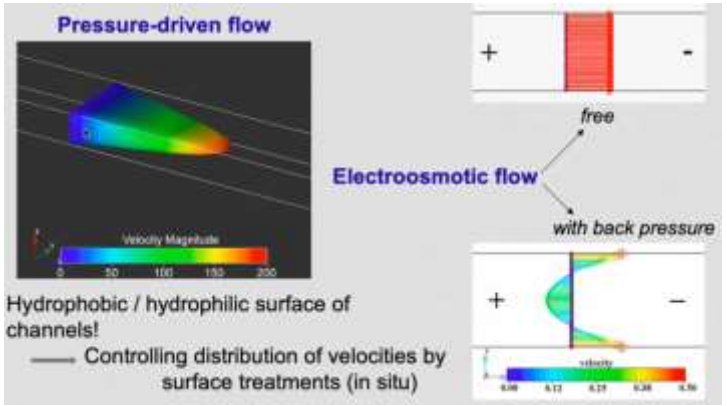

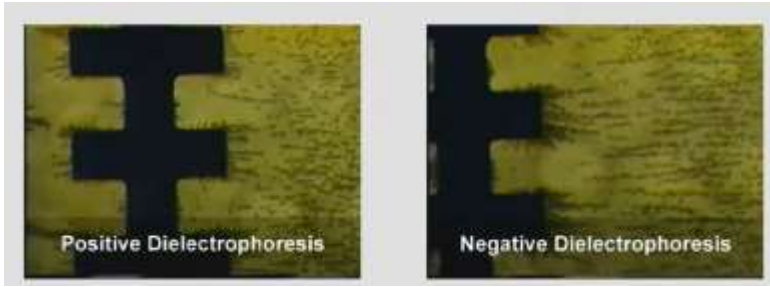

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Innovative Robots for Medical Applications: New Trends and Challenges

Prof. Doina PISLA, PhD

Technical University of Cluj-Napoca, Romania

28.07.2021

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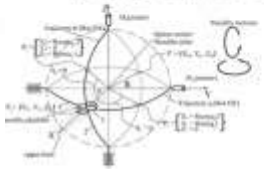
Kinematic scheme and CAD simulations (results published in *Sustainability*)



Final design

Experimental model

Clinical trials

(published patent OSIM 132233/14.06.2017)

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Mechanical testing of samples realized by 3D printing processes and SEM analyses

Preparation and SEM Microscopic Examinations

MSc. Eng. Maria Ratajczak
maria.ratajczak@put.poznan.pl

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Anisotropy of 3D-printed materials

Cristian VILĂU, Dan-Sorin COMȘA
TU Cluj-Napoca, Romania
Tuesday, 27th July 2021, 9:00-10:00 EET

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Lectures and presentations held by other participants at BRIGHT event

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STRUCTURAL OPTIMIZATION: TOPOLOGY OPTIMIZATION

Nikola Korunović, Assoc. Prof.
korunovic.nikola@gmail.com
Jovan Arandjelović, Asst.
Faculty of Mechanical Engineering in Nis

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Computational Design and Digital Fabrication Lab

Panagiotis Kyratsis
University of Western Macedonia, Greece
www.kyratsis.com

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Seminars held by colleagues at BRIGHT event

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Mechanical testing of standard samples

Filip Sarbinowski, MSc Eng
filip.j.sarbinowski@doctorate.put.poznan.pl
Faculty of Mechanical Engineering
Poznan University of Technology

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Mechanical testing of orthoses and prostheses

Radosław WICHNIARAK
Poznan University of Technology,
Faculty of Mechanical Engineering
radoslaw.wichniarek@put.poznan.pl

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

19-30 July 2021

Biomedical applications and challenges

- Personalised approach -

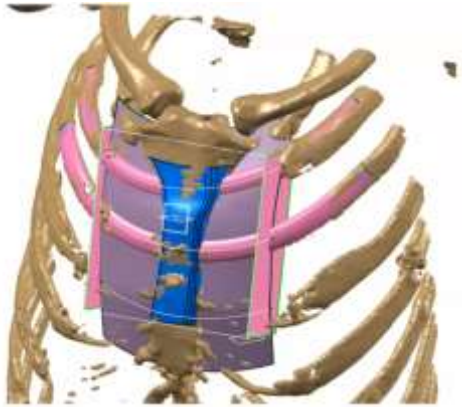
Prof. Dr Miroslav Trajanović

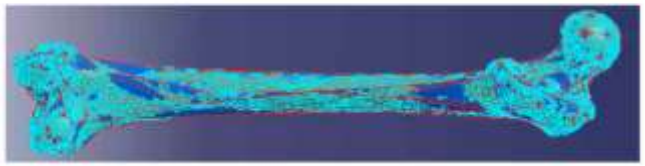
University of Niš, Faculty of Mechanical Engineering

28 July 2021

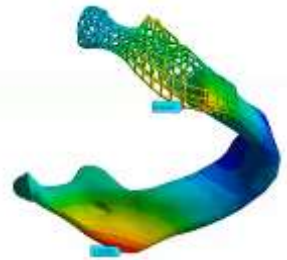
28.7.2021

III41017 Virtual human osteoarticular system and its application in preclinical and clinical practice





- Endoprostheses
- Fixators
- Macro-scaffolds



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Lectures and presentations held by other participants at BRIGHT event

BRIGHT International Summer School on:
3D printing for medical applications

Applications of 3D printing in medicine at STU MTF in Trnava

Slovak University of Technology in Bratislava
Faculty of Materials Science and Technology in Trnava
Institute of Production Technologies

Advanced Engineering s.r.o.
Veterná 8760/43
917 01 Trnava, Slovakia

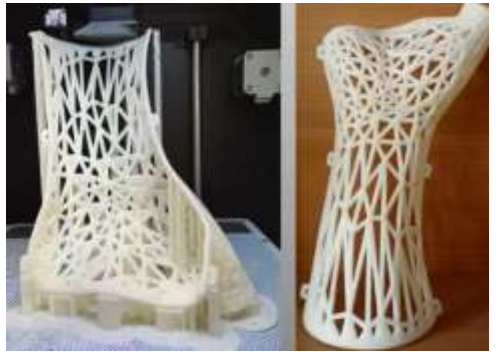
Ivan MOLNÁR, Dávid MICHAL

3 LIFE-SIZE HUMAN MODEL

- Material Extrusion process – FFF additive method – skeleton model
- Fused thermoplastic fibres extruded from the tip of a heated printing head moving in the X and Y axes
- Omni Factory 2.0 (Omni3D) and Sigmax R19 (BCN3D Technologies) production devices/3D printers
- Acrylonitrile Butadiene Styrene (ABS) – plastic material
- Production time – 621 hrs

Fig. 9 Several parts of the skeleton model produced by FFF additive method

28.7.2021 15/22



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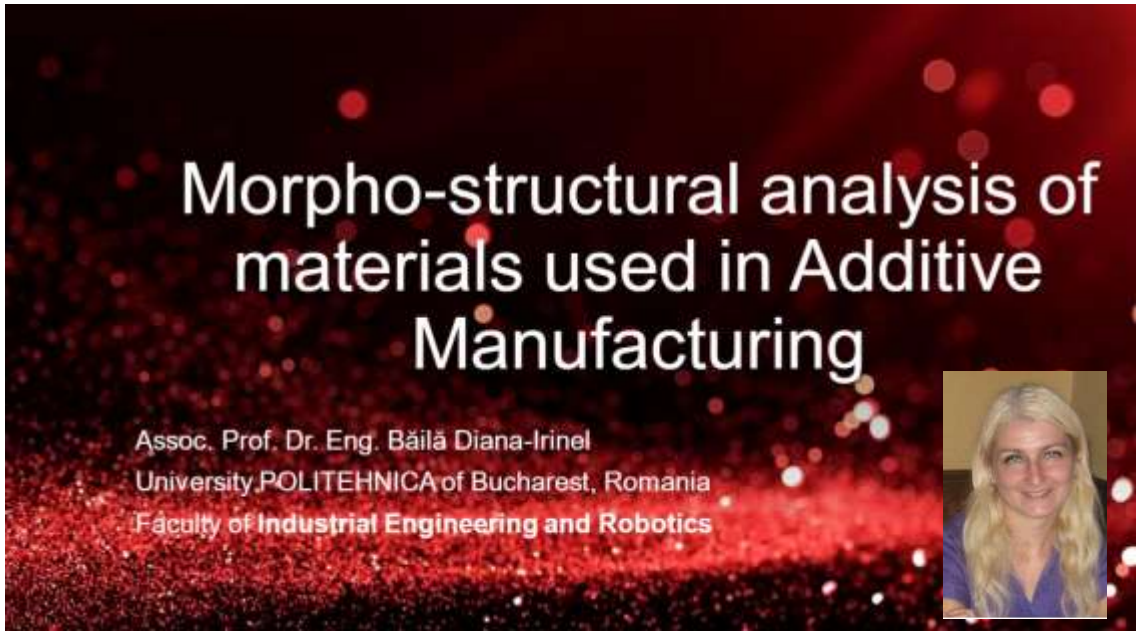

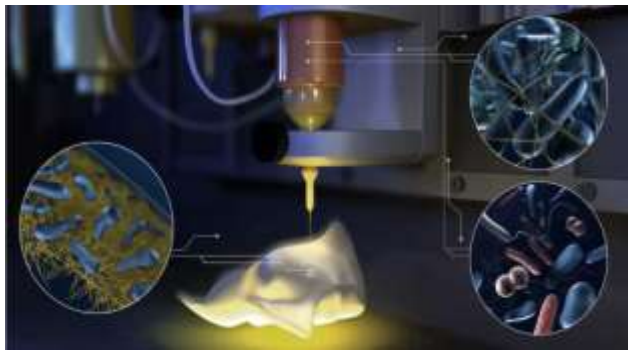

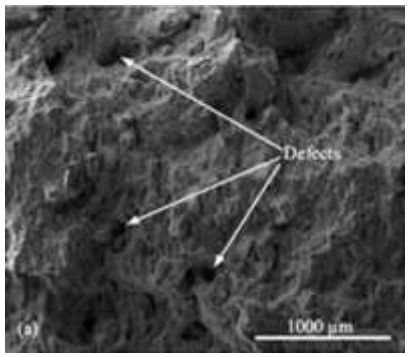

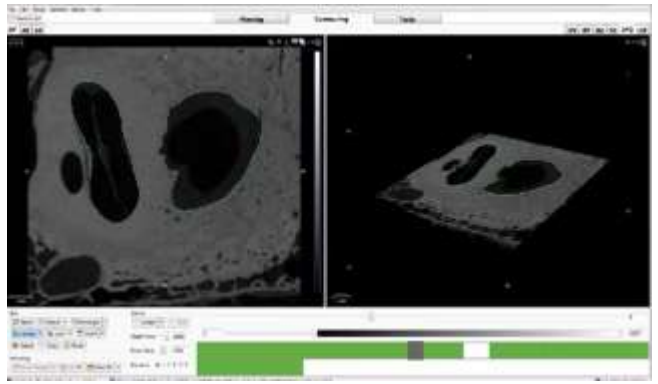

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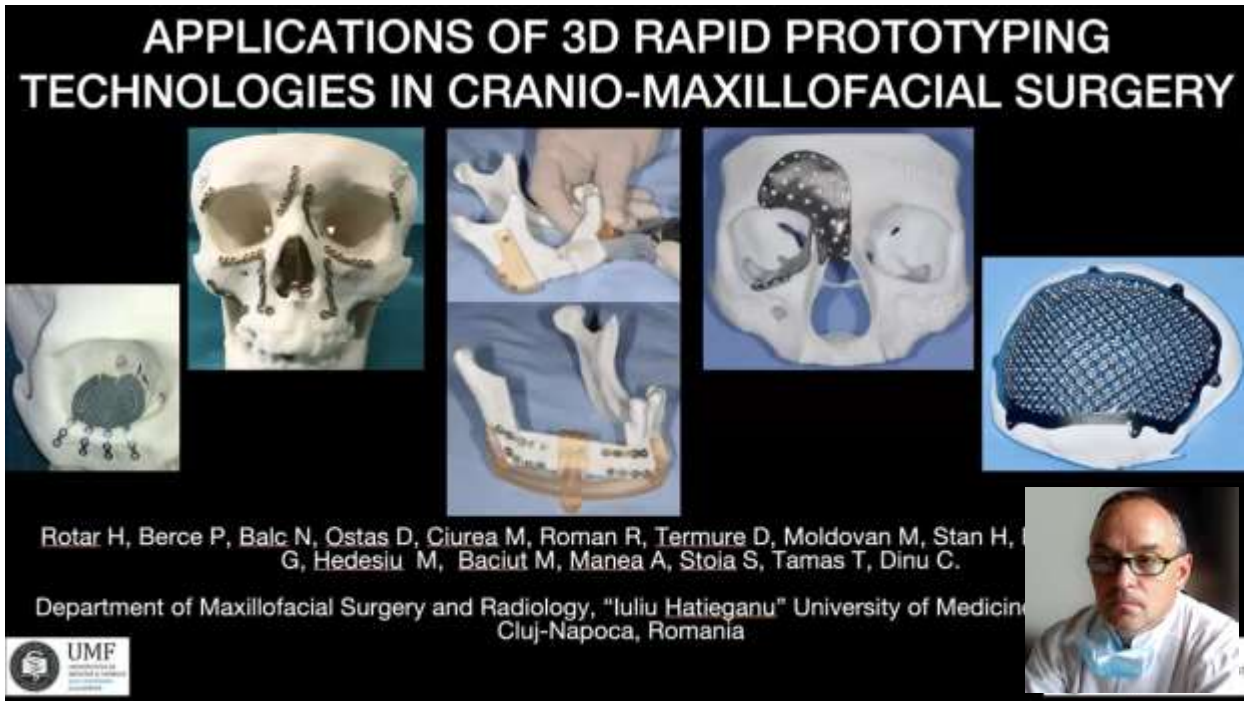

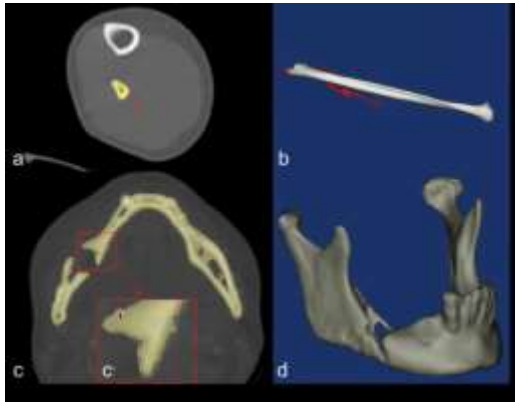

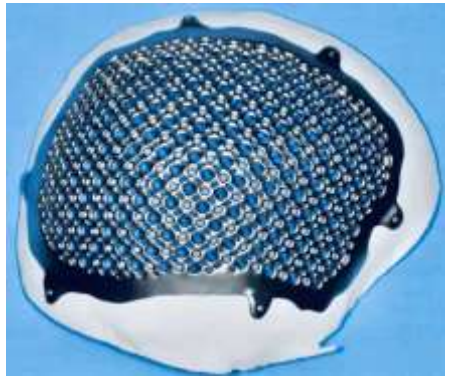

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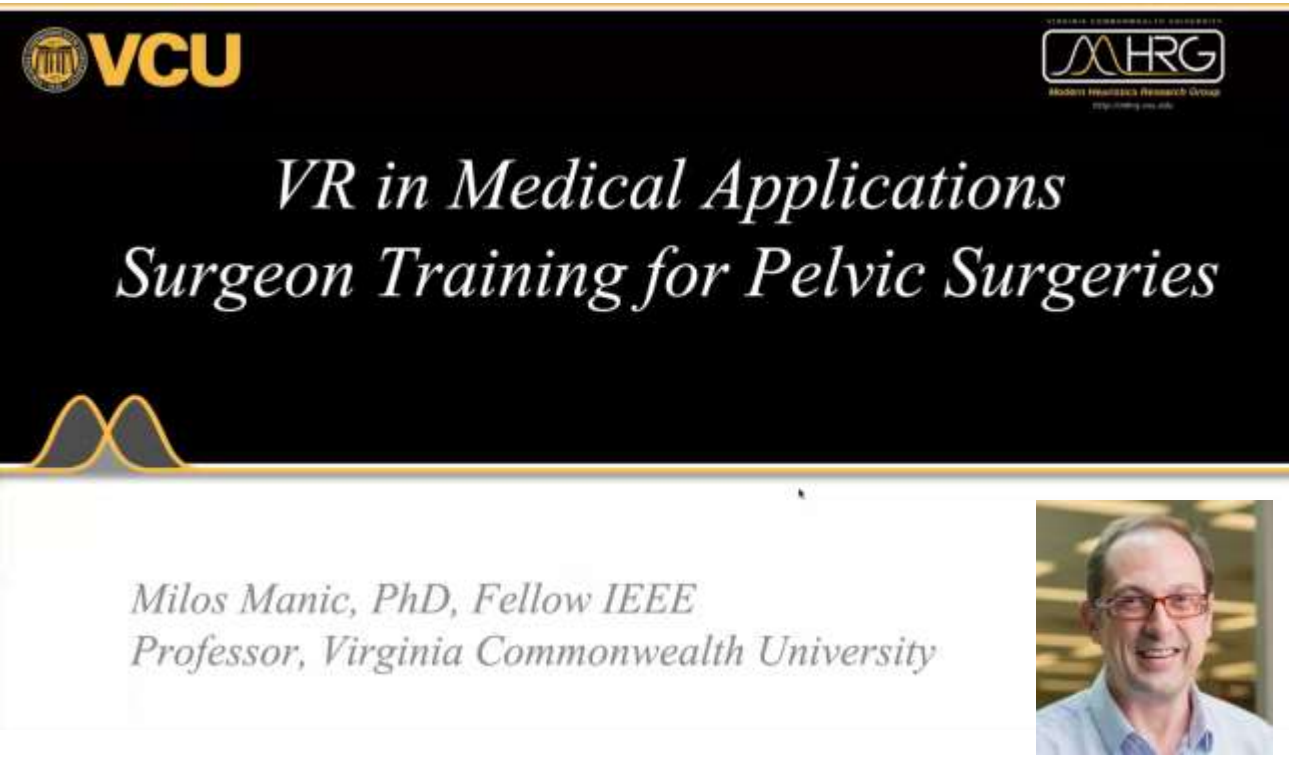

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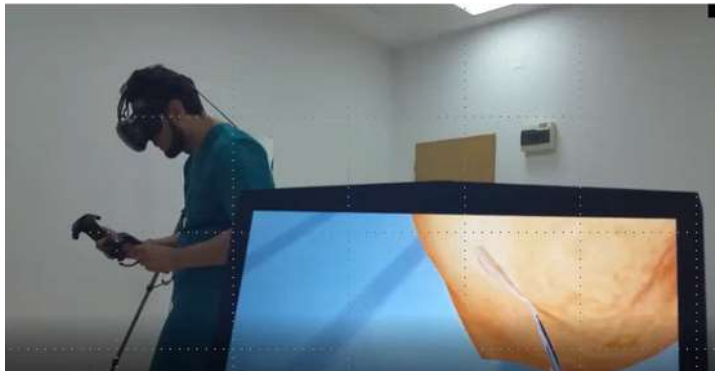

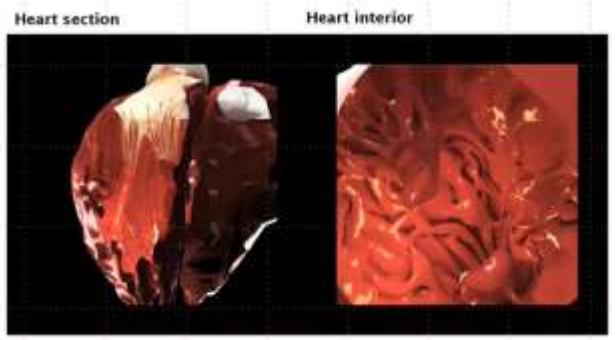

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

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Applications for VR developed at TU Cluj-Napoca

Assoc. Prof. Dr. Eng. Sergiu-Dan STAN

Virtual Reality Software

MATLAB

unity

VR devices used

There is also increasing use of the Oculus Rift within curricula in other fields such as marketing, architecture, clinical education, computer science and paramedics.

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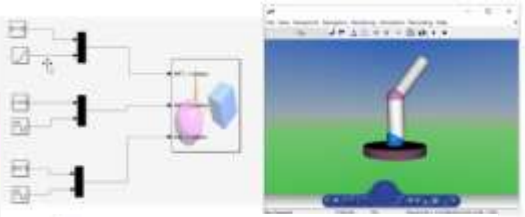
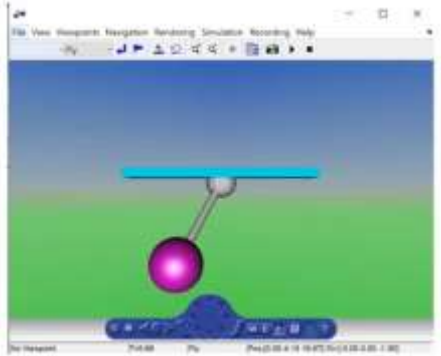
BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Erasmus+ Programme of the European Union

Applications for VR developed at TU Cluj-Napoca

Research. Eng. Alexandru OARCEA





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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Erasmus+ Programme of the European Union

Applications for VR developed at TU Cluj-Napoca

Research Eng. Victor Cobilean

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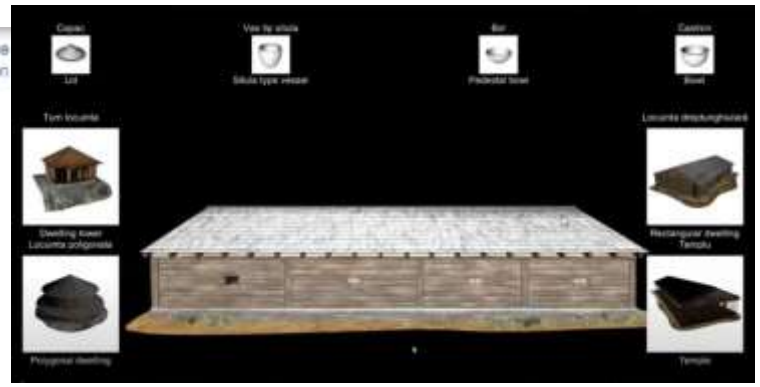
Lectures and presentations held by other participants at BRIGHT event

BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Applications for VR developed at TU Cluj-Napoca

Lecturer. Dr. Eng. Florin **POPISTER**



SW to VR

By Lecturer dr.eng. Alin Plesa

Alin.PLESA@mdm.utcluj.ro

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Companies and presentations of different important organizations

materialise

3D SYSTEMS

SLM SOLUTIONS

Stratasys

envisionTEC

symme3D

Nutechnologies

CADWORKS

SOLFINS

OMNI3D

SPEE3D

bizzcom

PRIMĂRIA CLUJ-NAPOCA

PRIMĂRIA ȘI CONSILIUL LOCAL

ADR NORD-VEST

TRANSILVANIA IT CLUSTER

MDPI

IntechOpen

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Presentation of important companies in the field of 3D design and 3D printing

materialise

Diana Skopina, Materialise (Leuven, Belgium)

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Presentation of important companies in the field of 3D design and 3D printing

Robin Bappert, SLM Solutions GmbH (Lubeck, DE)

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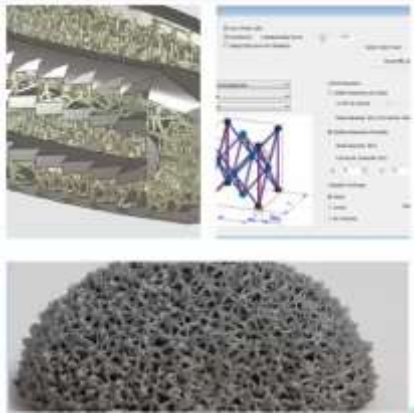
Presentation of important companies in the field of 3D design and 3D printing



3D SYSTEMS

Stefan Kapp, 3D systems company (Baden, Germany)

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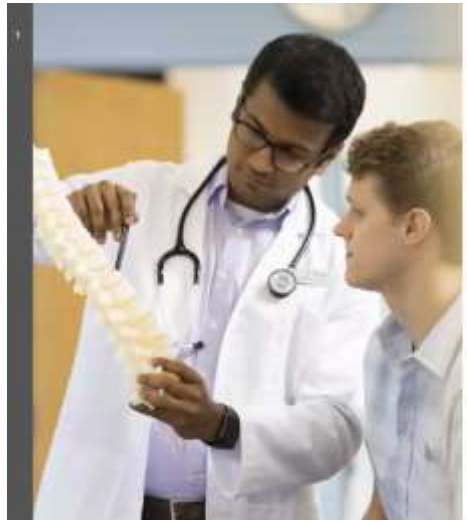
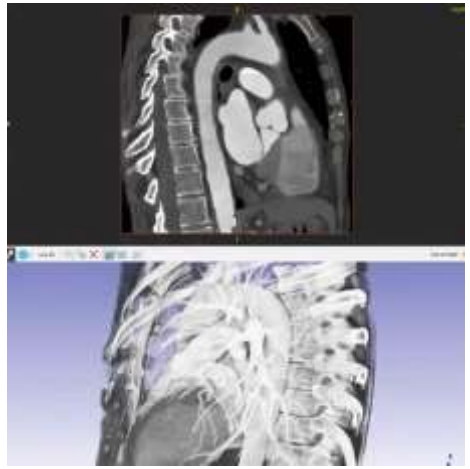
Presentation of important companies in the field of 3D design and 3D printing



Arnaud Toutain
Healthcare Senior Manager EMEA

Stratasys



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Presentation of important companies in the field of 3D design and printing

Carlos Carvalho– envisionTEC (Gladbeck, DE)

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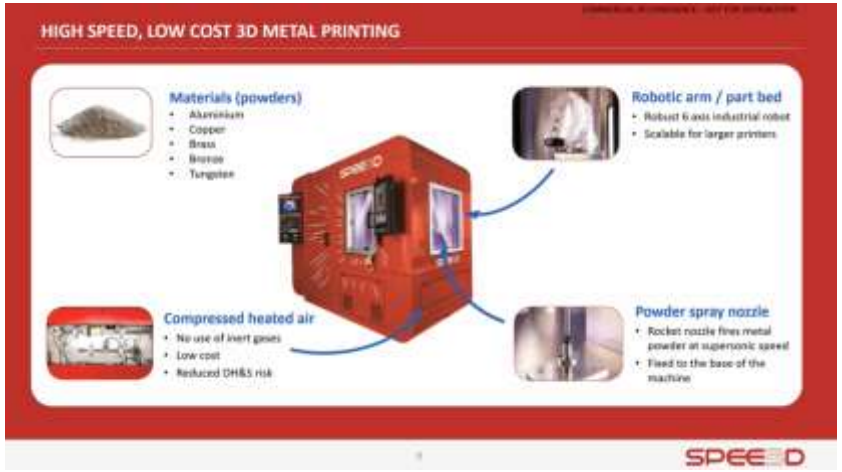
Presentation of important companies in the field of 3D design and 3D printing

SPEE3D



Stefan Ritt, Spee3D (Lubeck, DE)

Presentation of important companies in the field of 3D design and 3D printing

CADWORKS

Claudiu Birlogeanu (Craiova, RO)

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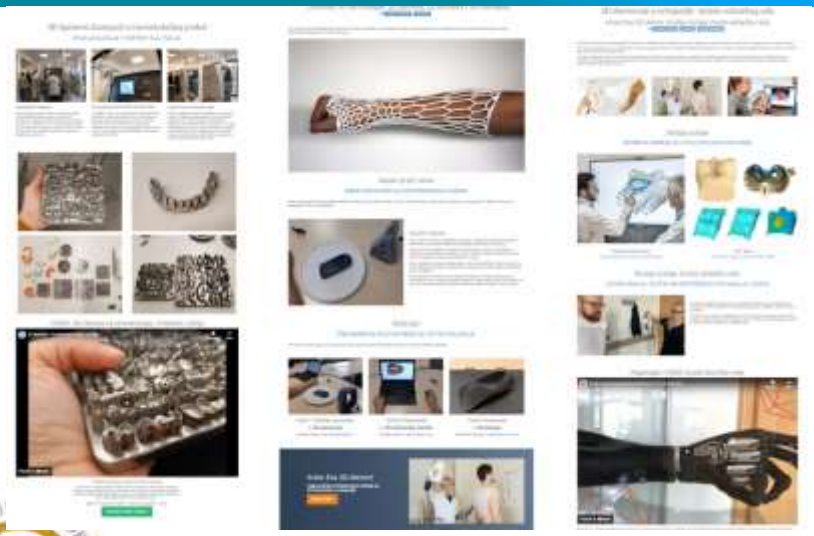
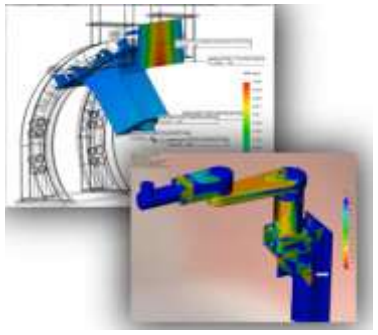


SOLFINS



Milos Momirovic (Belgrade, SRB)

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Presentation of important companies in the field of 3D design and 3D printing

Photos: www.orthoprint.pl

Krzysztof Kardach, Omni3D (Poznan, PL)

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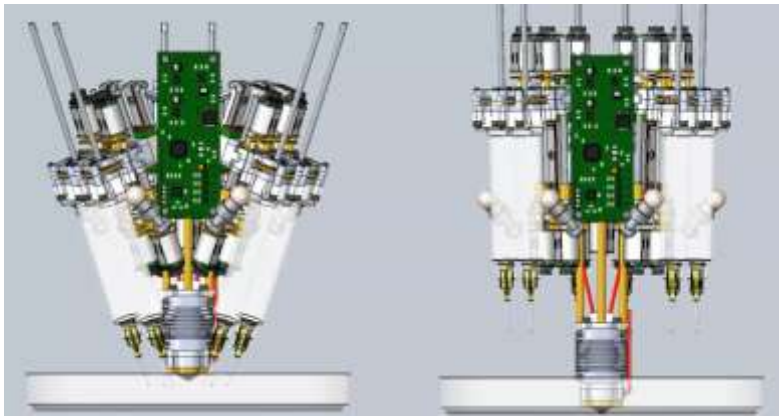
Presentation of important companies in the field of 3D design and 3D printing



symme3D

Calin Brandabur – Symme 3D (Timisoara, RO)

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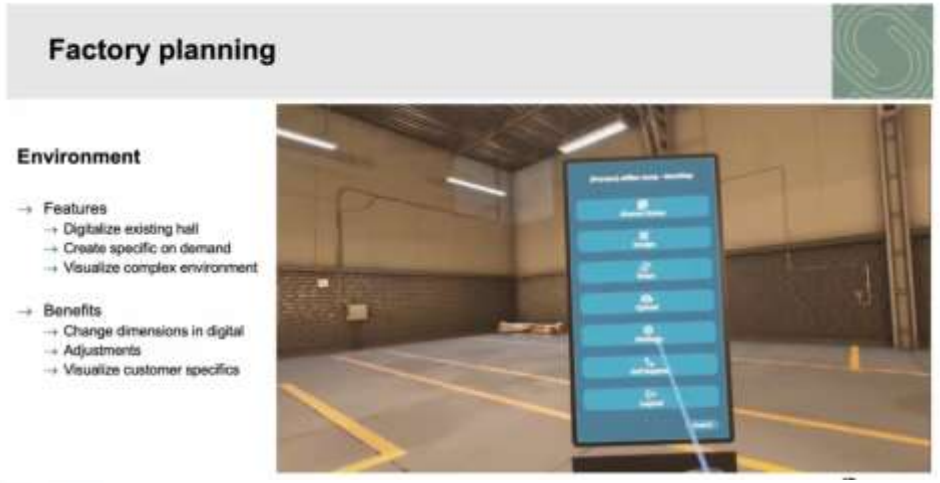

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Branislav Rabara
(BiZZCOM, SK)

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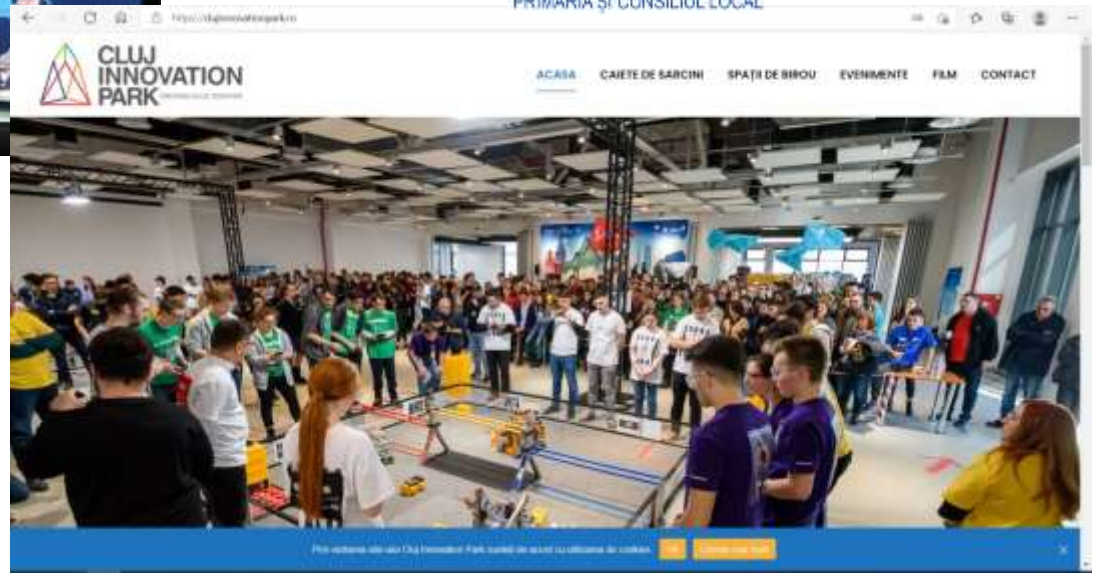
Presentations on behalf of City Hall institution of Cluj-Napoca

PRIMĂRIA ȘI CONSILIUL LOCAL



Oana Buzatu,
City Hall institution,
Cluj-Napoca, RO

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Presentations on behalf of Regional Development Agencies (RO)

Laviniu Chis, Department of INNO Platform
Development Agency of the North-West Region of Romania

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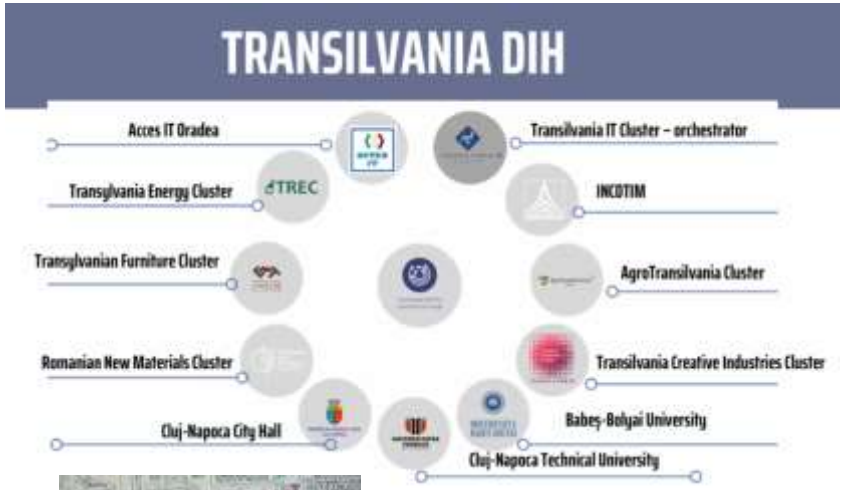
Presentation on behalf of important local cluster



Bianca Muntean, Transilvania IT cluster, RO

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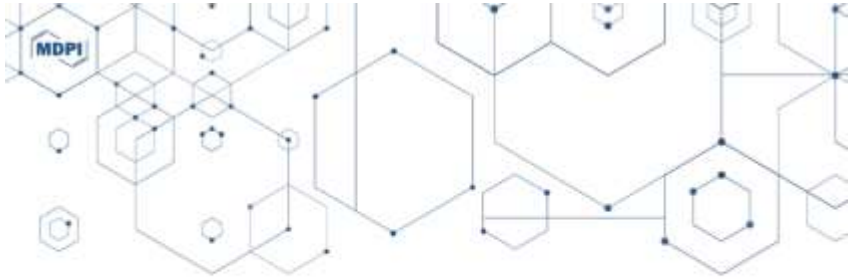
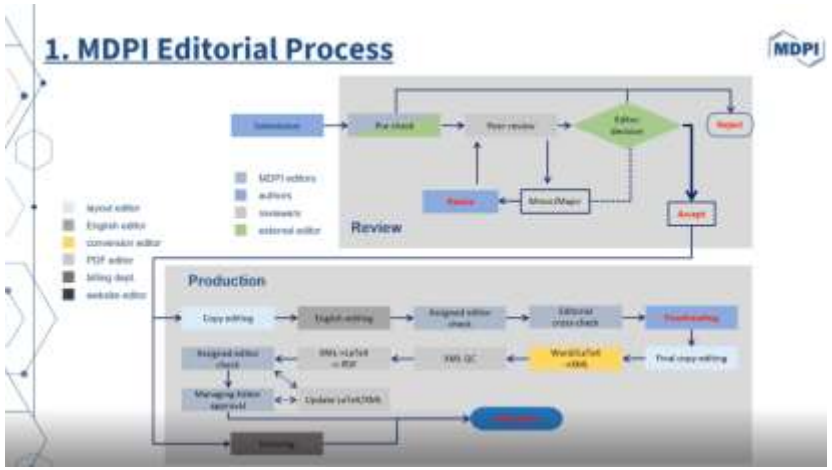
Presentation on behalf of International Publishing Houses about opportunities for disseminating of the results





https://www.mdpi.com/journal/materials

MDPI

Ms.Irina Pelin and Ms.Anca Banu, MDPI, RO

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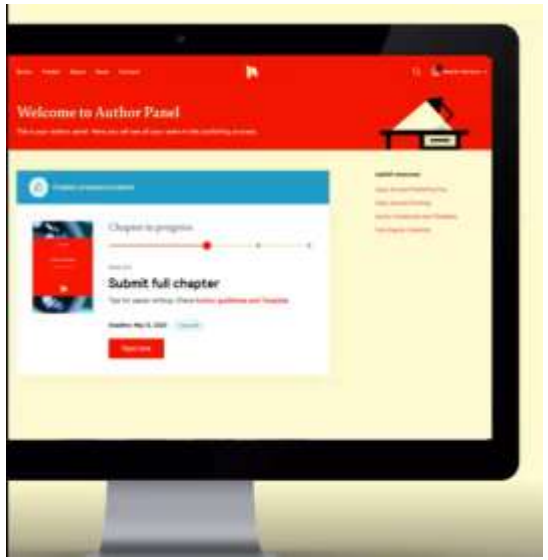

IntechOpen

Ms. Danijela Duric, IntechOpen, UK

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One of the main practical challenge of BRIGHT summer school 2021 edition
products to be re-designed by the students

PRODUCTS

1) face shield
2) mechanical hand prosthesis
3) openwork wrist hand orthosis



Launching of products to be redesigned by the students - Prof. Filip Gorski, Univ of Poznan, PL

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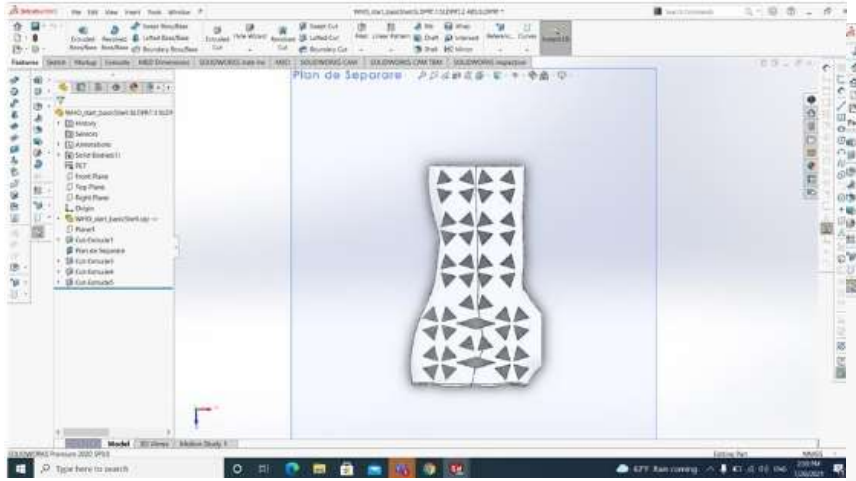
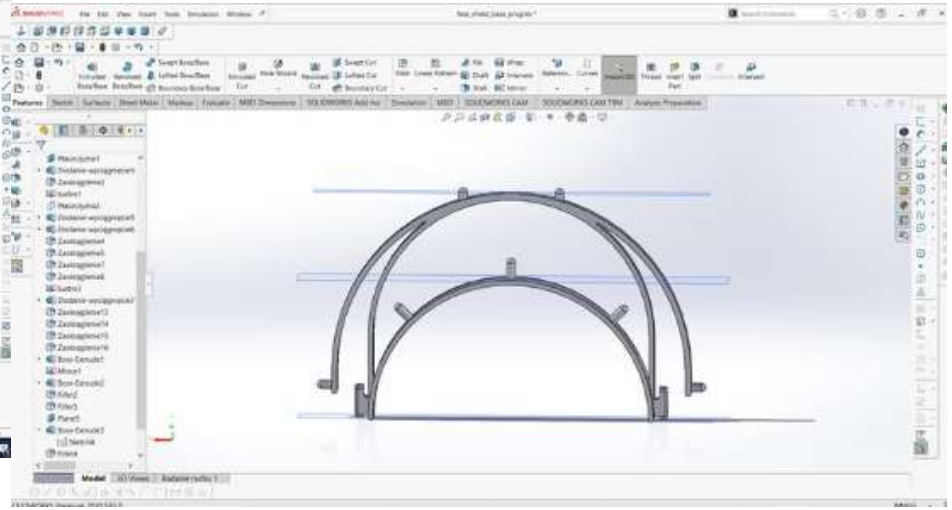
Working progress made by the students – CAD design





Designing of the products + Feedbacks from the CAD experts

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Working progress made by the students – CAE design

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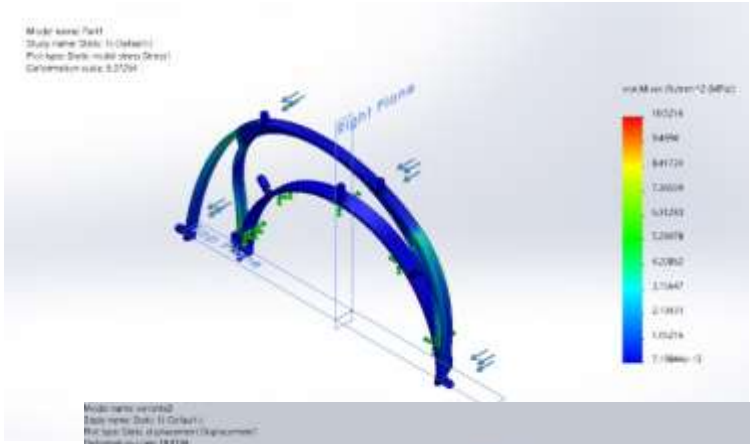
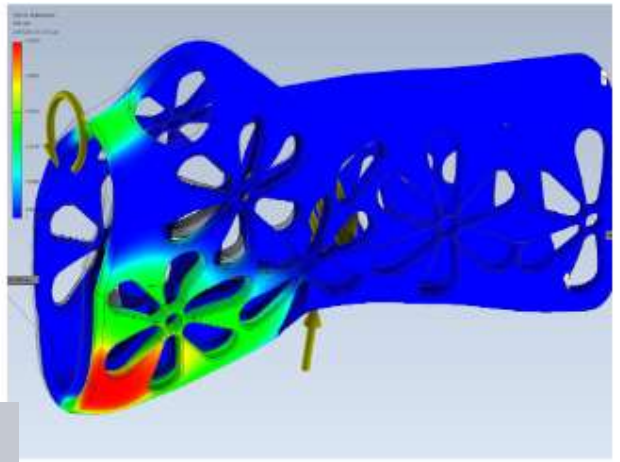
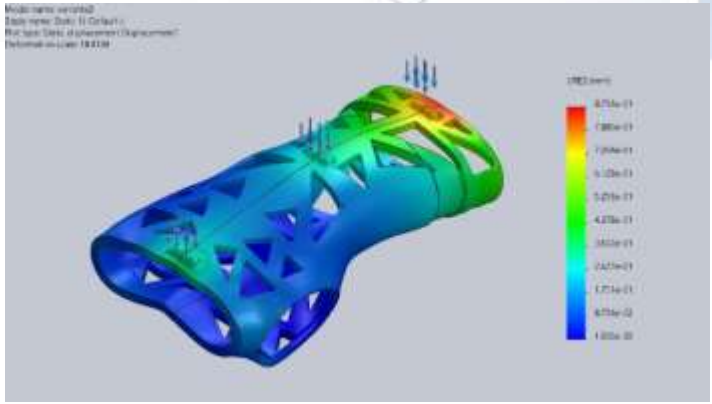
Defining the types of 3D-printed samples to be tested
- Seminar -

Dan-Sorin COMȘA, TU Cluj-Napoca, Romania
Tuesday, 20th July 2021, 15:00-16:00 EET







Feedbacks from CAE experts

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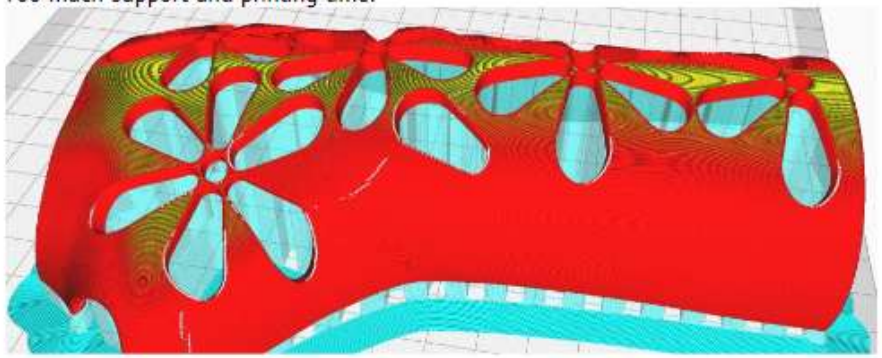
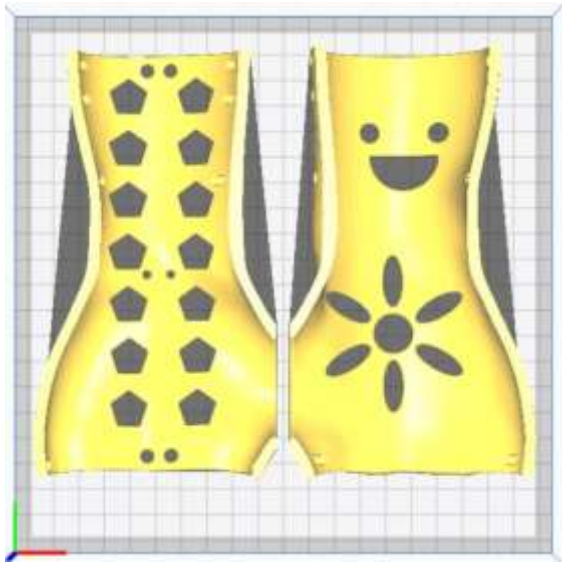
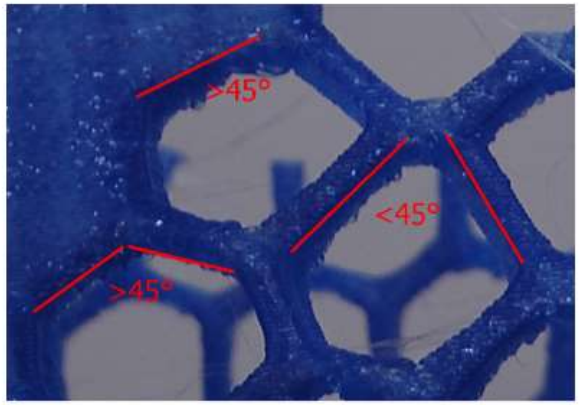
Working progress made by the students – 3D printing

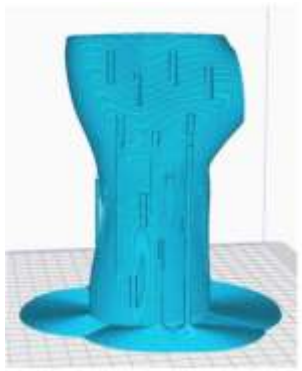
Too much support and printing time.

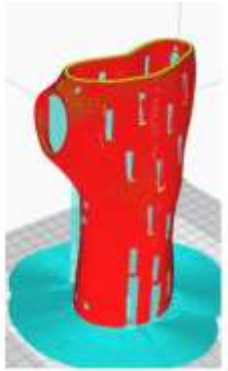


Rounding the sharp corner!









Feedbacks from 3D printing experts

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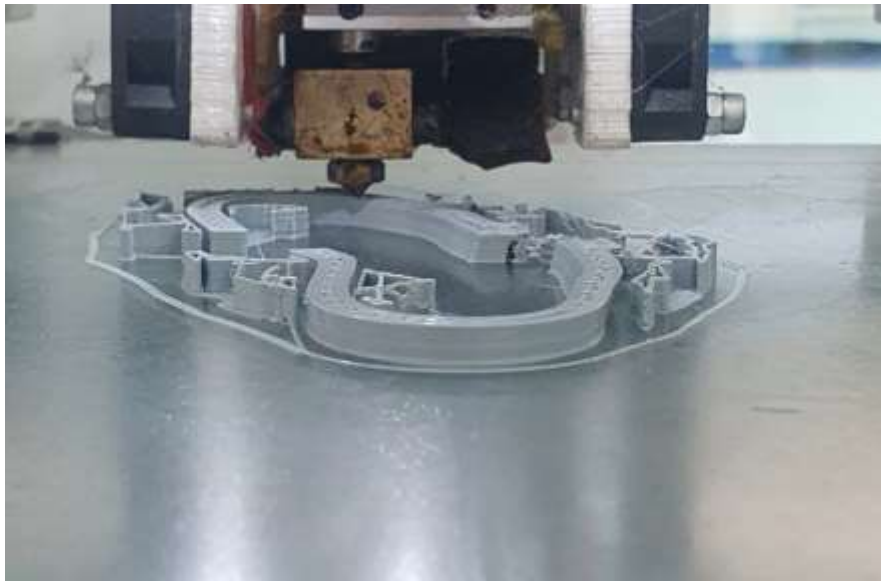
3D printing – results reached so far and issues to be solved



Feedbacks from 3D printing experts

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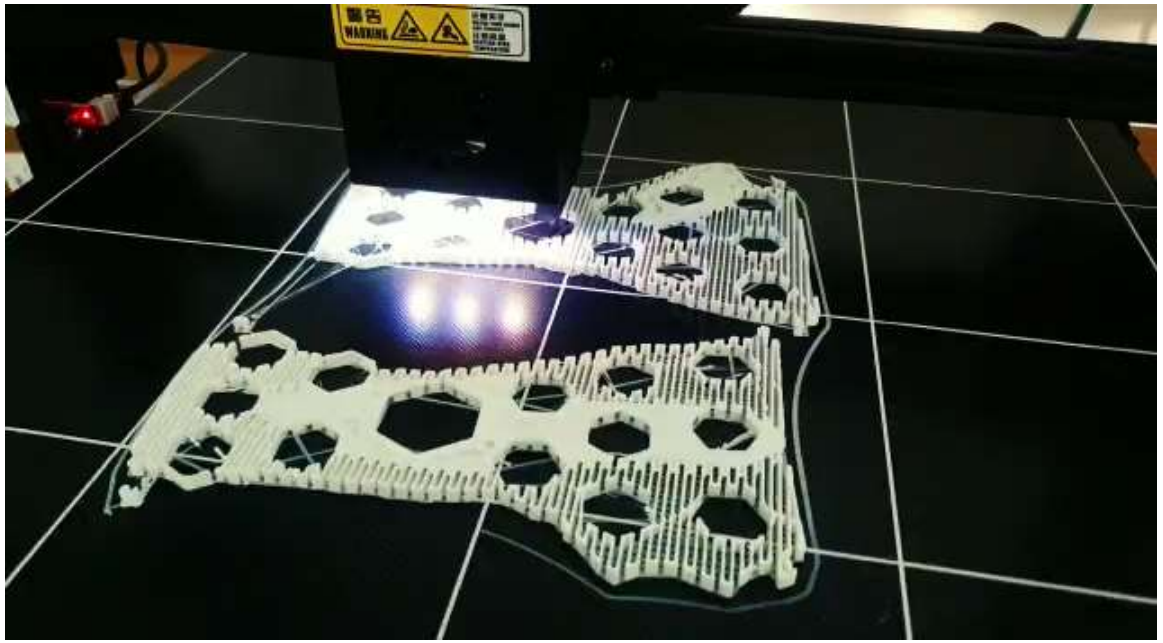
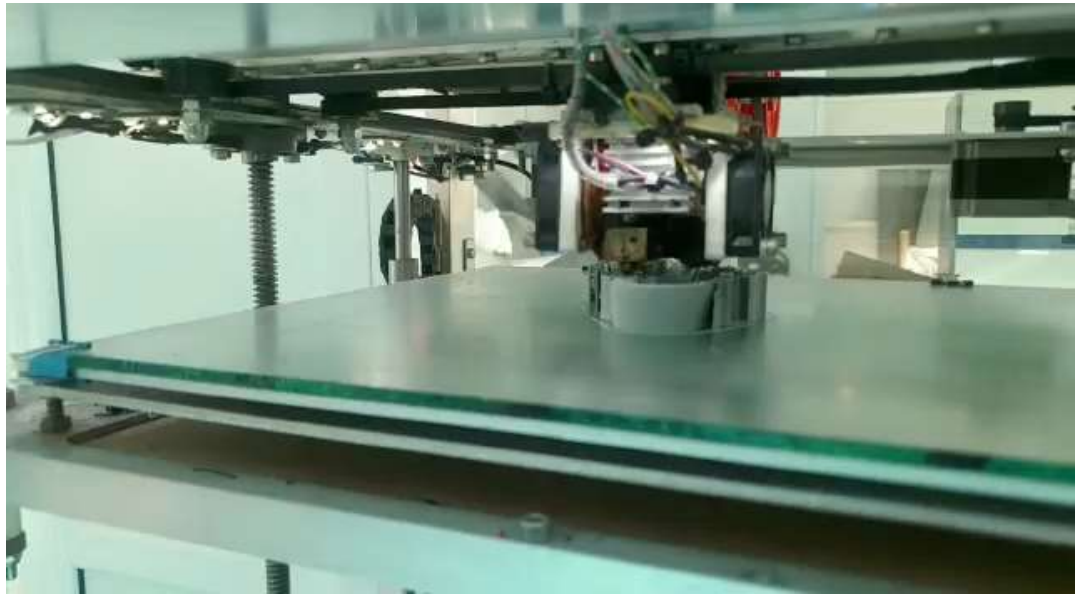
3D printing– results reached so far





Feedbacks from 3D printing experts

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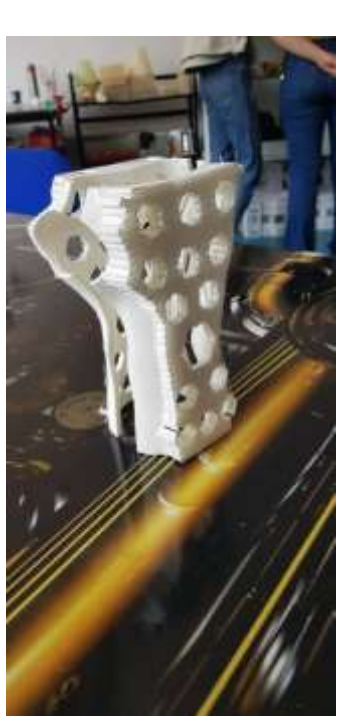
Final surprise of the ending of 1st week (TUCN, RO)



3D printing parts coming to life

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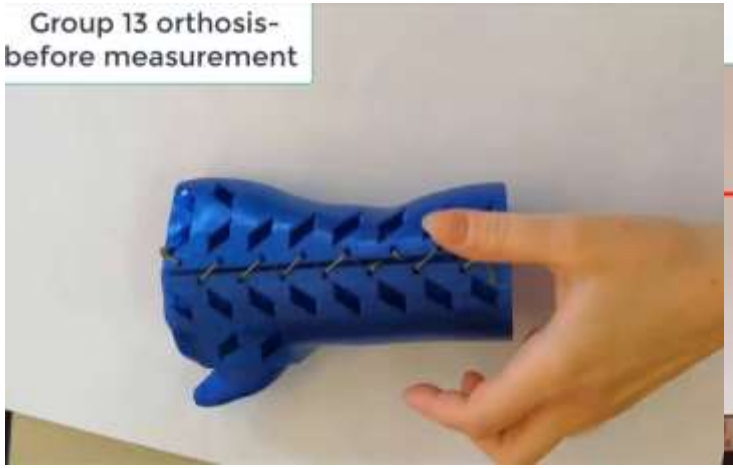
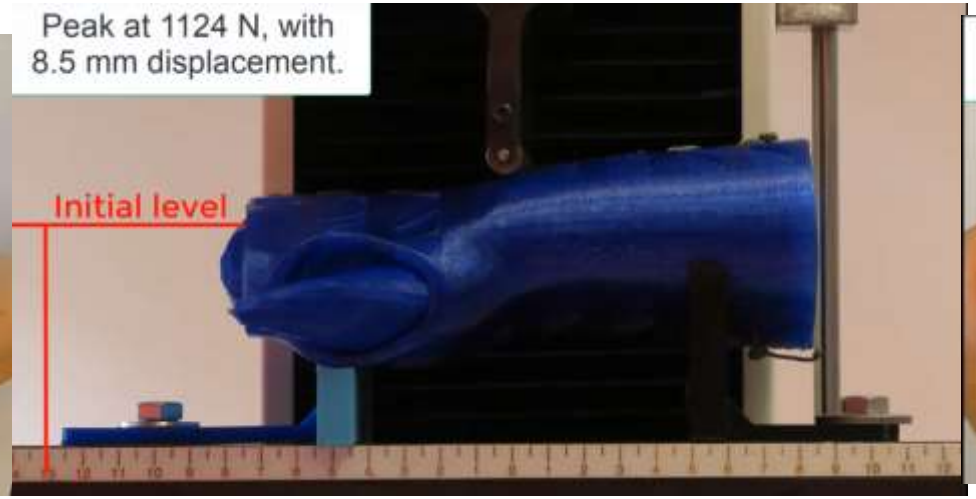
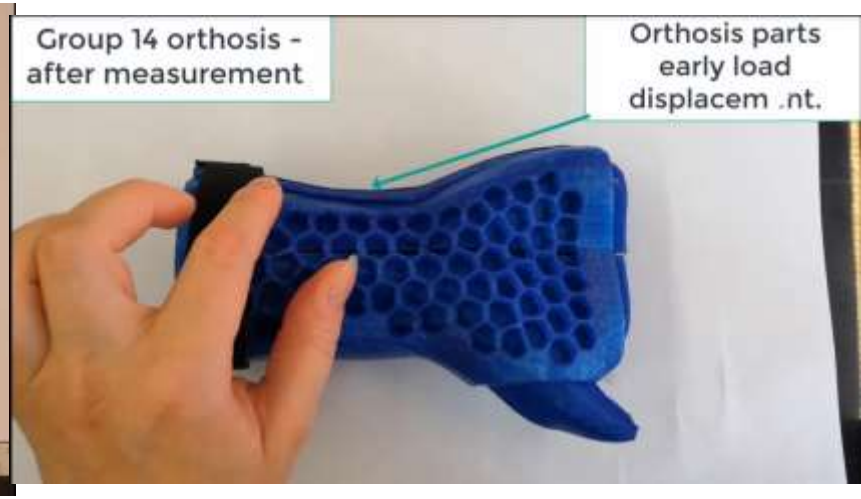
Working progress made by the students – Mechanical testing







Professional Feedback from Mechanical testing experts (Radoslaw Wichniarek, Sorin Comsa and Cristian Vilau)

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Final surprise of the ending of 1st week (TUCN, RO) – laboratory onsite visit

Students coming back to normal activities (onsite)

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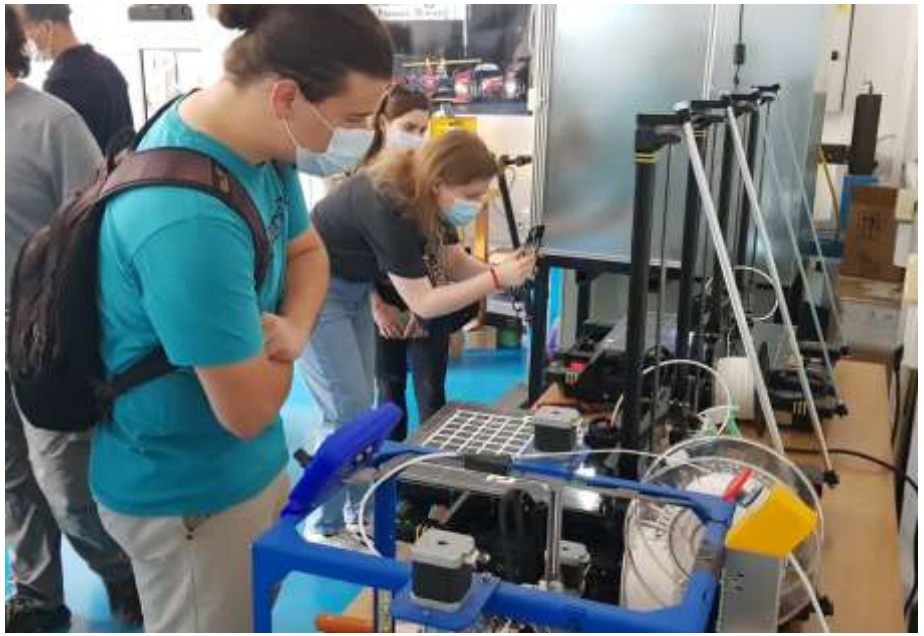

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Students coming back to normal activities (onsite)

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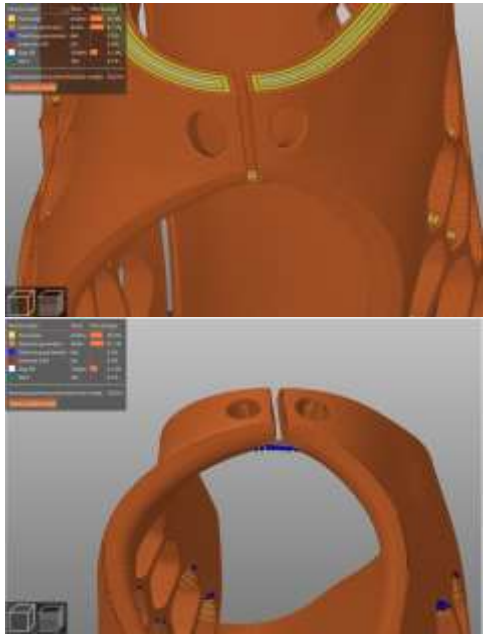
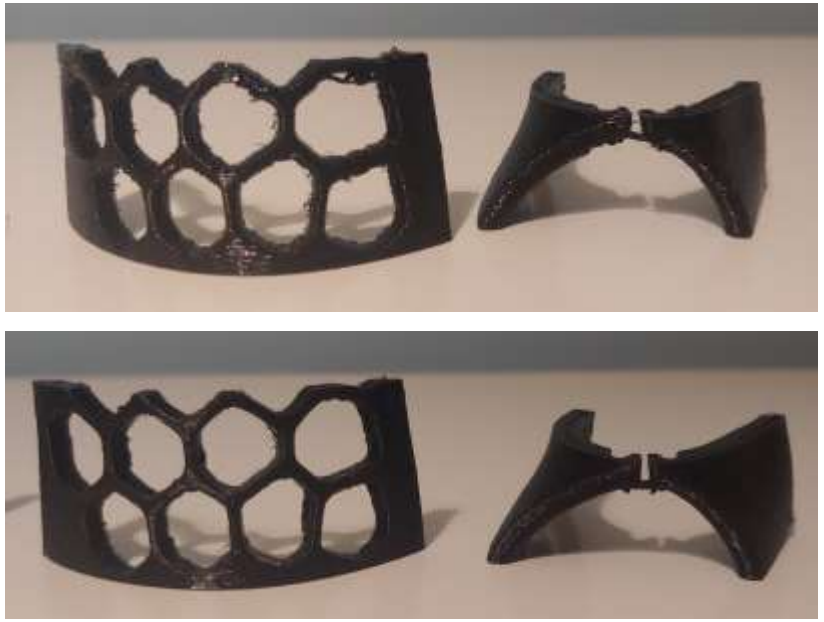
BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Final Presentations made by the students





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Motivating messages at the end of the presentations made by students

Fantastic 4 members:

Let's keep going with development of 3D printing for medical application for a brighter future ;)

y of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Motivating messages at the end of the presentations made by students

“Success is not final, failure is not fatal!”
Thank you!

Group 5,
“Engineers of the Future”,
Romania

Iaurum Diana-Otilia
Ilie Raul-Emanuel
Nemanu Buzdea-Iustina
Rapeanu Ioana-Viorica
Rotaru Igor
Tamas Paula-Irina
Vaida Ioana-Alexandra
Vasilachi Ionut
Jeno Tibor Albert

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Motivating messages at the end of the presentations made by students

East Balkan Design


Monica Rau


Vasile Portius


Ionut Peter


Robert Suflarszky


Pacnejer Andrei


Raluca Rus


Levente Orban


Mihai Pandrea


Ilinca Rus


Prof. Emilia Sabau

Innovate, so our future can be BRIGHT-er!

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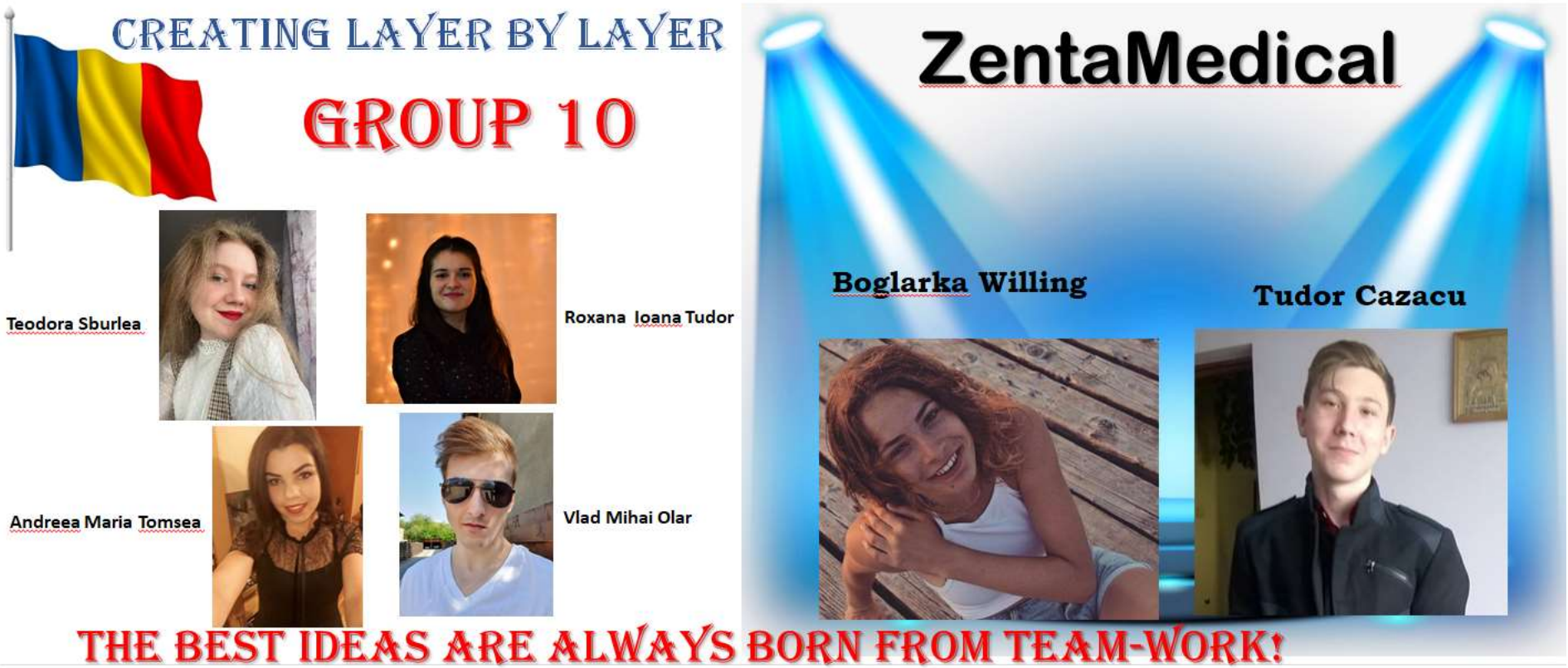
Motivating messages at the end of the presentations made by students



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Motivating messages at the end of the presentations made by students

Design without borders

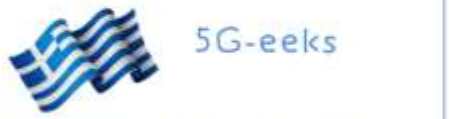
5G-eeks

Paper or Plastic ?

Quattro

We all 3D print in the same language. You can do it do!!

Thank you!!



5G-eeks

Athanasia Papadopoulou

Anastasia Moschou

Matina Papageorgiou

Lazaros Firtikiadis

Iasonas Chrysostomos Vasileiou

Paper or Plastic?

Juraj Vivoda
Mateo Gregorović
Anamarija Jurcan

Quattro

Viktorija Šipilova

Haralds Kārlis Šternbergs

Miks Biezbārdis

Oksana Stepanova

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Motivating messages at the end of the presentations made by students

Polishing design

Poltaters

Group no. 14

"Only the one who does not make mistakes is the one who does nothing."

Big thank you to BRIGHT team for a wonderful opportunity to work with experts!

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Motivating messages at the end of the presentations made by students

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Motivating messages at the end of the presentations made by students

Trio

Tetyana

Bogdan

Zinaida

Cassiana

Stefan

Thank you for your attention!

Thank you for your support and your valuable feedback!

We had lots of fun and hope to see you next year!

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

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Feedbacks on behalf of students to presentations made by the BRIGHT students

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Hall of fame - BRIGHTest star students of 2021 International Summer School edition

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

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Award ceremony of BRIGHT International Summer School 2021 edition

BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

AWARD CEREMONY

Remigiusz ŁABUDZKI
POZNAN UNIVERSITY OF TECHNOLOGY
POLAND

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Award Ceremony

Taking into account in particular the evaluation following criteria:

Complexeness of work
Quality of the presentation
Innovativeness

Professors decided to distinguish 6 teams of students:

3D minds (Poland)
Engineers of the future (Romania)
Zenta Mendical (Romania)
Cyber makers (Ukraine + Slovakia)
Brainstormers (Serbia+Slovakia)
TRIO (Ukraine+Moldova+Romania)

and the WINNER is....

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Award ceremony of BRIGHT International Summer School 2021 edition

Award Ceremony

POLTATERS team members:

Award Ceremony

The prize is a 3D logo printed by Rapid Prototyping technique

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Announcements about the main aims of BRIGHT International Summer School 2021 edition!

VERY IMPORTANT TO KNOW!!!!

Certificates with ERASMUS + label were offered to the BRIGHT International summer school participants at the end to the ones that have fulfilled the following conditions :

1. **the participants have attended to minimum 75 % of activities held at the BRIGHT Summer school (this includes lectures, presentations, labs, seminars, etc.);**
2. **the participants have defended the final test;**
3. **the participants have fulfilled the final questionnaire.**

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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Strong motivation for the next BRIGHT International Summer school – 2022 edition - in Croatia - to be remembered by all of you! Be sure that you will be there next year dear BRIGHT students! ☺

Most active students at BRIGHT summer school will be supported by the BRIGHT consortium to apply for ERASMUS scholarships for the BRIGHT International Summer School to be organized next year in Croatia (Brijuni Island) (July 2022) + they will have the chance to apply and work for their diploma projects in the field of 3D printing / VR/ AR / medical applications with the support and under supervision of BRIGHT partners consortium)!!!

BRIGHT International Summer School – TUCN – 19 -31.07.2021

Big thanks to all the participants to the BRIGHT International Summer School 2021 edition – Cluj-Napoca, Romania

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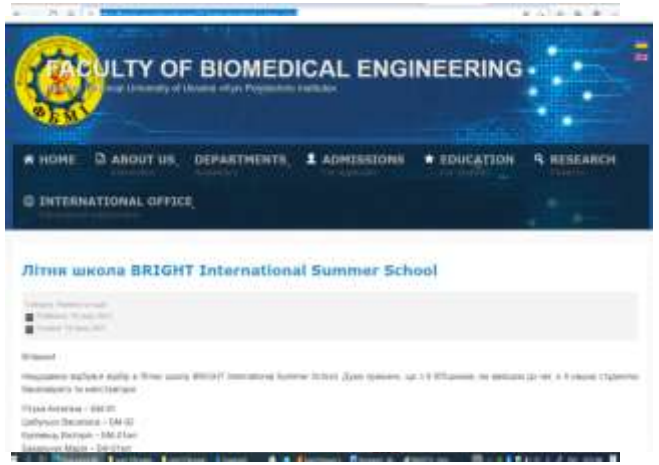
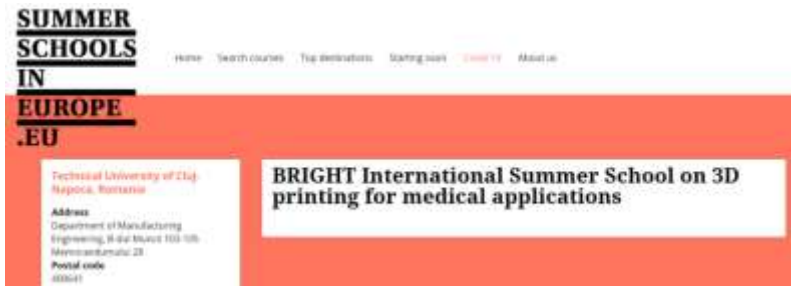
BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

Co-funded by the Erasmus+ Programme of the European Union

Positive national and international feedbacks related to the BRIGHT International Summer School 2021 edition





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BRIGHT project - Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

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Positive news in the local press related to the BRIGHT International Summer School 2021 edition

https://www.viata-medicala.ro/evenimente/scoala-de-vara-despre-imprimarea-3d-a-dispozitivelor-medicale-21868

Universitatea Tehnică din Cluj-Napoca organizează în colaborare cu experţii din consorţiul BRIGHT o şcoală de vară despre printarea 3D în domeniul medical.

Potrivit unui anunţ publicat pe site-ul *bright-project.eu*, şcoala de vară este intitulată **BRIGHT** International Summer School, iar tema de anul acesta este „3D printing for medical applications".

https://eclujeanul.ro/330-de-tineri-din-20-de-ari-au-venit-la-cluj-napoca-intr-un-program-erasmus-organizat-de-utcn-i-umf-cluj/

Home / Stiri locale / 330 de tineri din 20 de țări au venit la Cluj-Napoca într-un program ERASMUS, organizat de UTCN și UMF Cluj

STIRI LOCALE

330 de tineri din 20 de țări au venit la Cluj-Napoca într-un program ERASMUS, organizat de UTCN și UMF Cluj

2 luni ago · eClujeanul · No Comments

Școala Internațională de Vară în domeniul „Imprimării 3D cu aplicabilitate în domeniul medical", din cadrul proiectului internațional ERASMUS KA2 – BRIGHT debutează astăzi la Cluj-Napoca, iar 330 de tineri din 20 dd tari au venit în oraș pentru acest program.

„Cu această ocazie, le-am transmis participanților următorul mesaj: tinerii sunt o sursă inepuizabilă de creativitate, având capacitatea să își adapteze aptitudinile astfel încât să facă față cu brio oricărei provocări ale pieței muncii. Faptul că au ales să facă schimb de informații și de cunoștințe într-un astfel de proiect demonstrează că slujbele viitorului se vor baza

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BRIGHT – Transnational Project Meeting – 15 -16. 09.2021 – Nis, SRB

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BRIGHT – Transnational Project Meeting – 15 -16. 09.2021 – Nis, SRB

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BRIGHT – Multiplier Event – 17. 09.2021 – Nis, SRB

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BRIGHT – Multiplier Event– 17.09.2021 – Nis, SRB

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Setting updates, tasks and responsibilities for the next period – follow up after the Transnational Project Meeting and Multiplier event organized in Nis (September 2021)

IO2 - BRIGHT e-toolkit manual for digital learning in producing medical parts by 3D printing methods in the context of the pandemic (Assoc. Prof. Răzvan Păcurar, TUCN, project manager)

Open access on the platform?

Report?

2 Modules	How to produce skull implants using Selective Laser Sintering + Vacuum casting technologies	**TUCN, RO + University of Poznan, PL + University of Nis, SRB**
	How to produce implants using Selective Laser Melting technologies	
1 Module Stereolitography (Digital Light processing method)		**University of Nis, SRB + Univ Juraj Dobrila, HU**
1 Module Fused Filament Fabrication method or alternative		**Univ. of Poznan, PL + Univ Juraj Dobrila, HU**
1 Module Fused Deposition Modeling (Reprap technologies)		**Univ. of Poznan, PL + B. M. Plast d.o.o., HR**
1 Module Rapid Tooling methods		**STU Bratislava, SK + BIZZCOM s.r.o.**
3D printing of parts		**B. M. Plast d.o.o., HR**
		BIZZCOM s.r.o., SK

Starting: **1.06.2021**

Template?

Content?

Deadline: **30.11.2021**

The partners of the BRIGHT consortium are expected to provide similar toolkits in relation with the medical sector/3D printing by engaging other types of 3D printing that are available and can be used in the medical sector in a similar way.

For each module according to the skills and competences of the BRIGHT partners consortium, from the **Technical team there will be nominated 1-2 responsible persons** which will be in charge with the module and will need to provide the module for the e-toolkit manual.

Co-funded by the Erasmus+ Programme of the European Union

Setting updates, tasks and responsibilities for the next period – follow up after the Transnational Project Meeting and Multiplier event organized in Nis (September 2021)

1. applying for future common projects in the frame of ERASMUS, HORIZON programs, other research projects, etc. (all partners)
2. signing of ERASMUS bilateral agreements / CEEPUS (all partners)
3. Running common BSc./ MSc. Diploma projects, etc.) (all partners)
4. Starting of planning and organizing of TPM / LTT / ME for the next year

Tasks already fulfilled after the TPM and ME organized in Nis (October 2021)

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Erasmus+ strategic partnership for Higher Education

BOOSTING THE SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY OF 3D PRINTING METHODS IN PANDEMIC PERIOD

MODULE 1
CAD

Project Title	Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period 2020-1-RO01-KA226-HE-095517
Output	IO1 - BRIGHT e-learning support courses for curriculum aiming to boost the scientific excellence and innovation of 3D printing methods used for developing and producing medical parts in pandemic period
Module	Module 1 CAD
Date of Delivery	July 2021
Authors	Filip GÓRSKI Radosław WICHNIAREK Sven MARICIC Nikola VITKOVICH
Version	V1.2, 3.06.2021

BRIGHT

Erasmus+ strategic partnership for Higher Education

BOOSTING THE SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY OF 3D PRINTING METHODS IN PANDEMIC PERIOD

MODULE 2
CAE

Project Title	Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period 2020-1-RO01-KA226-HE-095517
Output	IO1 - BRIGHT e-learning support courses for curriculum aiming to boost the scientific excellence and innovation of 3D printing methods used for developing and producing medical parts in pandemic period
Module	Module 2 CAE
Date of Delivery	July 2021
Authors	Associate prof.dr.eng. Răzvan Păcurar, Associate prof.dr.eng. Nikola Korunovic, Lecturer dr.eng. Cristina Borzan, Lecturer dr.eng. Horea Chezan, Lecturer dr.eng. Vilău Cristian
Version	V1, 31.07.2021

BRIGHT

Erasmus+ strategic partnership for Higher Education

BOOSTING THE SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY OF 3D PRINTING METHODS IN PANDEMIC PERIOD

MODULE 3
Material Science & Strength of Materials

Project Title	Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period 2020-1-RO01-KA226-HE-095517
Output	IO1 - BRIGHT e-learning support courses for curriculum aiming to boost the scientific excellence and innovation of 3D printing methods used for developing and producing medical parts in pandemic period
Module	Module 3 Material Science & Strength of Materials
Date of Delivery	July 2021
Authors	Remigiusz LABUDZKI Radosław WICHNIAREK Filip SARBINOWSKI Sven MARIČIĆ
Version	FINAL VARIANT, 20.07.2021

BRIGHT

Erasmus+ strategic partnership for Higher Education

BOOSTING THE SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY OF 3D PRINTING METHODS IN PANDEMIC PERIOD

MODULE 4
Flexible manufacturing systems

Project Title	Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period 2020-1-RO01-KA226-HE-095517
Output	IO1 - Bright e-learning support courses for curriculum aiming to boost the scientific excellence and innovation of 3D printing methods used for developing and producing medical parts in pandemic period
Module	Module 4 Flexible manufacturing systems
Date of Delivery	August 2021
Authors	Peter Koštál, Vanessa Prajová, Miriam Matúšová, Erika Hrušková, Andrea Mudriková
Version	V6, final 02.8.2021

BRIGHT

Erasmus+ strategic partnership for Higher Education

BOOSTING THE SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY OF 3D PRINTING METHODS IN PANDEMIC PERIOD

MODULE 5
3D PRINTING

Project Title	Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period 2020-1-RO01-KA226-HE-095517
Output	IO1 - Mapping and scientific literature review on the mechatronics skills for Industry 4.0
Module	Module 5 3D Printing
Date of Delivery	July 2021
Authors	Associate prof. dr.eng. Răzvan Păcurar, Associate Prof.dr.eng. Nikola Vitković Associate prof.dr.eng. Aleksandar Miltenović
Version	Final variant, 18.07.2021

Course modules prepared by the consortium within IO1 ready to be published as “open book”

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Tasks already fulfilled after the TPM and ME organized in Nis (October 2021)

materials

IMPACT FACTOR 3.623 | Covered in: PubMed

MDPI

Open Access Article

Thin Films Deposition of Ta_2O_5 and ZnO by E-Gun Technology on Co-Cr Alloy Manufactured by Direct Metal Laser Sintering

by Diana-Irinel Băilă [1,*], Cătălin Vițelaru [2], Roxana Trușcă [1], Lidia Ruxandra Constantin [2], Ancuța Păcurar [3], Constantina Anca Porau [2] and Răzvan Păcurar [1,*]

1 Department of Manufacturing Engineering, Faculty of Industrial Engineering and Robotics, Polytechnic University of Bucharest, Splaiul Independenței nr. 313, Sector 6, 060042 Bucharest, Romania
2 National Institute for Research and Development in Optoelectronics, Atomiștilor 409, 077125 Măgurele, Romania
3 Department of Manufacturing Engineering, Faculty of Industrial Engineering, Robotics, Management and Production Management, Technical University of Cluj-Napoca, B-dul Muncii 103-105, 400641 Cluj-Napoca, Romania
* Authors to whom correspondence should be addressed.

Academic Editors: Stanisław Legutko and Szymon Wojciechowski

Materials **2021**, *14*(13), 3656; https://doi.org/10.3390/ma14133656

Received: 29 April 2021 / Revised: 17 June 2021 / Accepted: 25 June 2021 / Published: 30 June 2021

(This article belongs to the Special Issue Precision and Ultra-Precision Subtractive and Additive Manufacturing Processes of Alloys and Steels)

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Open Access Article

Cast Iron Parts Obtained in Ceramic Molds Produced by Binder Jetting 3D Printing—Morphological and Mechanical Characterization

by Răzvan Păcurar [1,*], Petru Berce [1], Ovidiu Nemeș [2,*], Diana-Irinel Băilă [1,*], Dan Sergiu Stan [4], Alexandru Ovnicek [4], Florin Popișter [5], Cristina Miron Borzan [1], Sven Maricic [6], Stanislaw Legutko [7] and Ancuța Păcurar [1]

1 Department of Manufacturing Engineering, Faculty of Industrial Engineering, Robotics and Production Management, Technical University of Cluj-Napoca, B-dul Muncii 103-105, 400641 Cluj-Napoca, Romania
2 Department of Environmental Engineering and Sustainable Development Entrepreneurship, Faculty of Materials and Environmental Engineering, Technical University of Cluj-Napoca, B-dul Muncii 103-105, 400641 Cluj-Napoca, Romania
3 Department of Manufacturing Engineering, Faculty of Industrial Engineering and Robotics, Polytechnic University of Bucharest, Splaiul Independenței nr. 313, Sector 6, 060042 Bucharest, Romania
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6 Institute for Science and Technology VISIO, Juraj Dobrila University of Pula, 52100 Pula, Croatia
7 Faculty of Mechanical Engineering, Poznan University of Technology, 60-965 Poznan, Poland
* Authors to whom correspondence should be addressed.

Academic Editor: Antonino Recca

Materials **2021**, *14*(16), 4502; https://doi.org/10.3390/ma14164502

Received: 9 May 2021 / Revised: 3 August 2021 / Accepted: 9 August 2021 / Published: 11 August 2021

(This article belongs to the Special Issue Precision and Ultra-Precision Subtractive and Additive Manufacturing Processes of Alloys and Steels)

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materials

IMPACT FACTOR 3.623 | Covered in: PubMed

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materials

IMPACT FACTOR 3.623 | Covered in: PubMed

MDPI

Open Access Article

Selective Laser Melting of PA 2200 for Hip Implant Applications: Finite Element Analysis, Process Optimization, and Morphological and Mechanical Characterization

by Răzvan Păcurar [1,*], Petru Berce [1], Anca Petrițan [1], Ovidiu Nemeș [2], Cristina Ștefania Miron Borzan [1], Maria Harničárová [3,4] and Ancuța Păcurar [1]

1 Department of Manufacturing Engineering, Faculty of Industrial Engineering, Robotics, Management and Production Management, Technical University of Cluj-Napoca, B-dul Muncii 103-105, 400641 Cluj-Napoca, Romania
2 Department of Environmental Engineering and Sustainable Development Entrepreneurship, Faculty of Materials and Environmental Engineering, Technical University of Cluj-Napoca, B-dul Muncii 103-105, 400641 Cluj-Napoca, Romania
3 Department of Electrical Engineering, Automation and Informatics, Faculty of Engineering, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia
4 Department of Mechanical Engineering, Faculty of Technology, Institute of Technology and Business in České Budějovice, Okružní 10, 370 01 České Budějovice, Czech Republic
* Authors to whom correspondence should be addressed.

Academic Editor: Joseph Sanderson

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Received: 29 April 2021 / Revised: 5 July 2021 / Accepted: 26 July 2021 / Published: 29 July 2021

(This article belongs to the Special Issue Advanced Laser Microfabrication)

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MDPI

Open Access Article

Mathematical Approach in Complex Surfaces Toolpaths

by Florin Popișter [1,*], Daniela Popescu [1], Ancuța Păcurar [2] and Răzvan Păcurar [2,*]

1 Department of Design Engineering and Robotics, Faculty of Industrial Engineering, Robotics and Production Management, Technical University of Cluj-Napoca, B-dul Muncii 103–105, 400641 Cluj-Napoca, Romania
2 Department of Manufacturing Engineering, Faculty of Industrial Engineering, Robotics and Production Management, Technical University of Cluj-Napoca, B-dul Muncii 103–105, 400641 Cluj-Napoca, Romania
* Authors to whom correspondence should be addressed.

Mathematics **2021**, *9*(12), 1360; https://doi.org/10.3390/math9121360

Received: 28 April 2021 / Revised: 7 June 2021 / Accepted: 9 June 2021 / Published: 12 June 2021

View Full-Text | Download PDF | Browse Figures | Citation Export

mathematics

IMPACT FACTOR 2.258 | CITESCORE 2.2 SCOPUS

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Publications in ISI journals (Q1) – 4 publications in 2021

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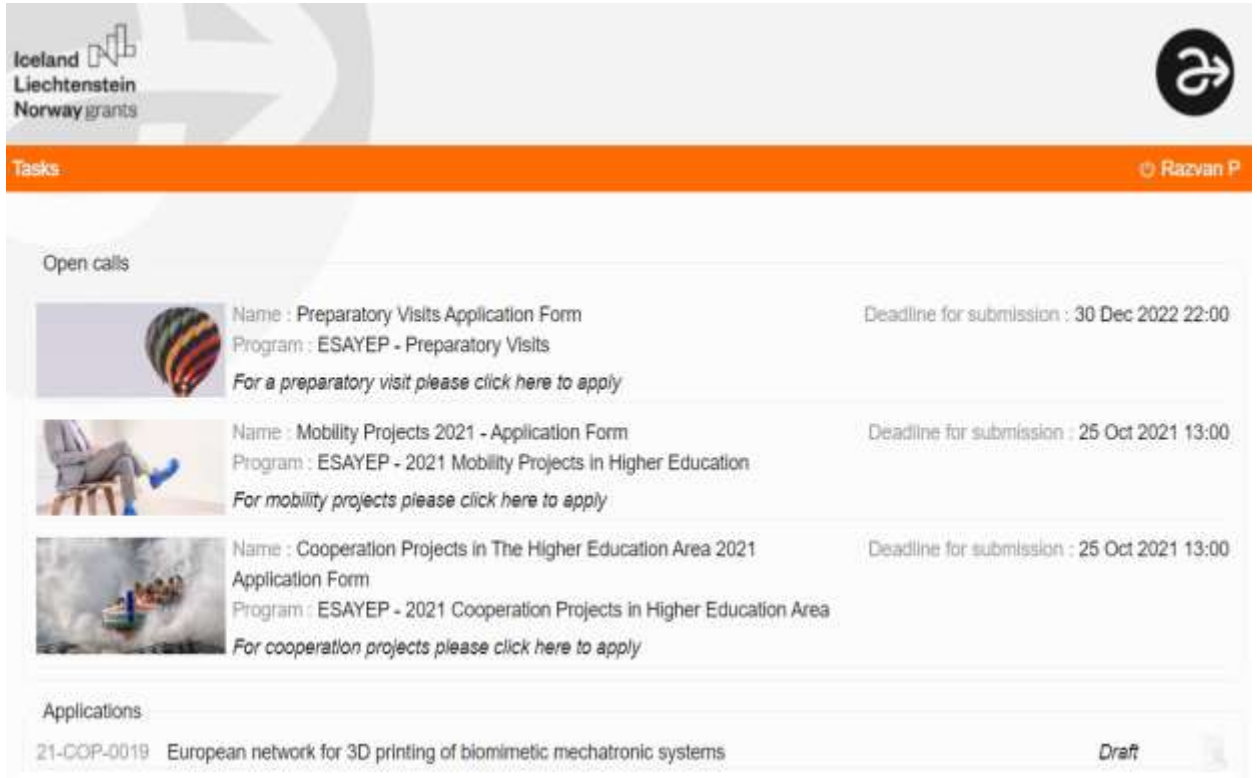
Tasks already fulfilled after the TPM and ME organized in Nis (October 2021)



European network for 3D printing of biomimetic mechatronic systems

===== EMERALD =====

New project proposal – interdisciplinary – involving 3D printing / bio-mechatronics / materials science / computer programming Augmented / Virtual reality / medical engineering - Iceland, Liechtenstein, Norway grants (EEA)

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MANUFACTURING

www.manufacturing.put.poznan.pl
www.facebook.com/manufacturing2022
manufacturing@put.poznan.pl

Special Session SS_15

Design and rapid manufacturing of customized medical products

Brief description of the specific scientific scope of the Special Session:

Medicine and biomedical engineering are today among the most vital applications of computer aided design and 3D printing (additive manufacturing). Both doctors and patients, as well as scientists can benefit from recent advancements in this technology and its increasing availability at acceptable cost. Customized medical products, both for doctors and patients, become a standard and their design and production processes must be studied, optimized and improved in order to obtain tangible progress. Therefore, this Special Session is dedicated to research and review papers tackling the problems of computer aided design and rapid manufacturing in medical and biomedical engineering applications, especially for customized implants, orthopaedic and prosthetic devices, other artificial organs and new methods of treatment, utilizing devices designed and manufactured individually for a specific patient.

List of topics of interest:

1. CAD design of anatomical models,
2. Processing of medical imaging data for development of customized, anatomically adjusted products,
3. 3D scanning and reverse engineering techniques in medicine and biomedical engineering,
4. Mass customization in medicine, design automation,
5. Selection and improvement of materials for 3D printed medical products,
6. Optimization of 3D printing processes of customized medical products,
7. XR techniques (Virtual and Augmented Reality) in design of medical products,
8. Numerical simulation of 3D-printed structures used in medicine,
9. Destructive and non-destructive testing of 3D printed individualized medical products.

Members of the Special Session Organizing Committee:

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Manufacturing 2022
ISI conference

Lecture Notes in Mechanical Engineering

Scopus

Clarivate
Web of Science™

Submission Deadline: 31.10.2021

Springer Publishing House

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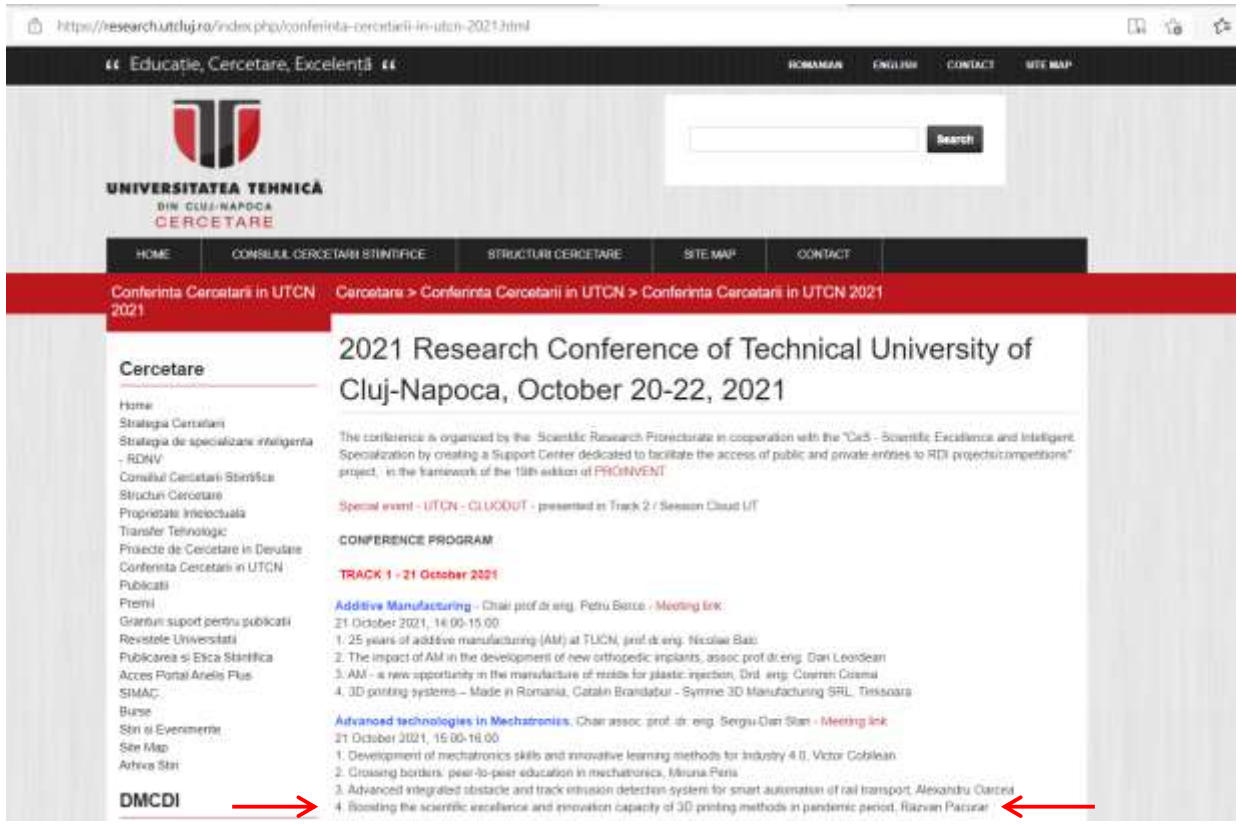

Presentation held at the 2021 Research Conference of Technical University of Cluj-Napoca - 21st of October 2021

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Plenary speaker invitation at the International IMANEE 2021 scientific conference in Iasi – www.imane.ro

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BSc /MSc/PhD thesis directions organized in mentorate / co-mentorate variant established (still opened to be completed)

1. Automation of the design of the openwork for the WHO orthosis in the selected CAD system.
2. Virtual prosthesis configurator of the Robohand type.
3. Prototyping of a child upper-limb prosthesis for cycling.
4. Prototyping of a device for measuring the strength of the adductors of the hand stump.
5. Optimization of the FFF process from the point of view of the production of orthoses.

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BSc /MSc/PhD thesis directions organized in mentorate / co-mentorate variant established (still opened to be completed)

6. Designing and realizing of bone structures (lattice structures) by 3D printing (shin, knee, hip, etc.)
7. Designing and manufacturing of customized medical implants by 3D printing methods (metallic implants / structures made of Titanium alloys, Co-Cr, etc.) – hip implants, dental implants, etc.
8. Manufacturing of skull implants / vertebral implants made of PEEK material by 3D printing
9. Manufacturing of medical stents /bye-pass systems made of biocompatible materials by SLA
10. Manufacturing of medical orthoses – hand orthoses, foot orthoses, pelvic orthoses) by 3D printing

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BSc /MSc/PhD thesis directions organized in mentorate / co-mentorate variant established (still opened to be completed)

11. Manufacturing of biomimetic robotic hands / neuro-skeletons / artificial hands for people with special needs (amputated arms, fingers, etc) by 3D printing methods
12. Manufacturing of medical devices for fixing the patients during different surgical operations (by 3D printing methods)
13. Manufacturing of 3D printing / hybrid equipment items that combines 3D printing methods with CNC equipment / mechatronic / robotic systems destined for testing new types of materials
14. Virtual Reality / Augmented Reality / mixed reality applications for medical domain)
15. Manufacturing of tissues, vessels, human organs, biocompatible structures using 3D bioprinting

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Quick overview of the Intellectual outputs related to the BRIGHT project

IO3 - BRIGHT e-learning virtual laboratory platform for boosting the scientific capacity and innovation in teaching processes related to medical parts made by 3D printing methods in pandemic period

(Assoc. prof. MSc. Eng. Peter Koštál, STU Bratislava)

Starting: **1.12.2021**

Virtual laboratory with 3 rooms:

Open access on the platform?

VR / AR methods?

Content?

Report?

Deadline: **31.07.2022**

Virtual laboratory environment / including of Virtual reality elements in the platform	**STU Bratislava**
1 room for CAD / CAE programming - preparing the e-library with medical models	**TUCN, RO & Univ of Juraj Dobrila, HR**
1 room for 3D Printing Processes and Preparation	**Univ. of Poznan, PL**
1 room of Testing and control	**University of Nis, SRB**
The real printing of the prepared parts	**B. M. Plast d.o.o.,HR & BIZZCOM s.r.o., SK**
The testing procedures	**all partners**

For each room according to the skills and competences of the BRIGHT partners consortium, from the **Technical team there will be nominated 1-2 responsible persons** which will be in charge with the virtual room and will need to provide the informations for the virtual room of the virtual laboratory.

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Challenge and strong motivation for students ☺

Most active students at BRIGHT summer school will be supported by the BRIGHT consortium to apply for ERASMUS scholarships for the BRIGHT International Summer School to be organized next year in Croatia (Brijuni Island) (July 2022) + they will have the chance to apply and work for their diploma projects in the field of 3D printing / VR/ AR / medical applications with the support and under supervision of BRIGHT partners consortium)!!!

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Challenge and strong motivation for students ☺

TUCN – strategic partner within the European University of Technology EuT+ (https://www.univ-tech.eu/) and ERASMUS + programs

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Acknowledgments

BRIGHT professors from the Board of the University, the Faculty and Department of Manufacturing Engineering (Technical University of Cluj-Napoca, RO)

Rector, prof.dr.eng. Vasile TOPA

Vice rector with International relations, prof. dr.eng. Dan Mandru

Dean of the Faculty of Industrial Engineering, Robotics and Production Management, prof.dr.eng. Corina Birleanu

Head of Department of Manufacturing Engineering, assoc. prof.dr.eng. Adrian Trif

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Acknowledgments

Technical assistance for the entire summer school & realizing / updating of BRIGHT web page:

Alexandru Ianosi, TUCN, RO

BRIGHT concept logo

Lea Grguric, Delnice, HR

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BRIGHT responsible of the groups

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Ancuta Pacurar, TUCN, RO
Sergiu Dan Stan, TUCN, RO
Catalin Moldovan , TUCN, RO
Alexandru Ianosi, TUCN, RO
Alexandru Oarcea, TUCN, RO
Victor Cobilean, TUCN, RO
Mihai Ciupan, TUCN, RO
Alin Plesa, TUCN, RO
Vilau Cristian, TUCN, RO
Emilia Sabau, TUCN, RO

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Martin Necpal, STU, SK
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Krzystof Lukaszewski, Poznan, PL
Ivan Veljovic, Istria, HR
Matea Grdic, Istria, HR

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BRIGHT professors that have delivered presentations related to summer school topic

Prof. Petru Berce, TUCN, RO
Prof Nicolae Balc, TUCN, RO
Prof. Cristian Dudescu, TUCN, RO
Prof. Popa Catalin, TUCN, RO
Prof. Doina Pisla, TUCN, RO
Associate prof. Sorin Comsa, TUCN, RO
Associate prof. Dan Sergiu Stan, TUCN, RO
Lecturer Stefan Bodi, TUCN, RO
Lecturer Alin Plesa, TUCN, RO
Lecturer Florin Popister, TUCN, RO

Researcher Alexandru Oarcea, TUCN, RO
Researcher Victor Coblinean, TUCN, RO
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Prof. Radoslaw Wichniarek, Univ. of Poznan, PL
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Prof. Panagiotis Kyriakis, Univ of W. Macedonia, GR
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Prof. Milos Manic, Virginia Commonwealth University, USA

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Representatives on behalf of the companies that have made presentations at this edition of BRIGHT International Summer School (2021)

Diana Skopina (Materialise)

Robin Bappert (SLM Solutions)

Stefan Ritt (Spee3D)

Stefan Kapp (3D Systems)

Arnaud Totain (Stratasys)

Carlos Carvalho (envisionTEC)

Milos Momirovic (Solfins)

Bransilav Rabara (Bizzcom)

Krzysztof Kardach (Omni 3D)

Calin Brandabur (Symme 3D)

Cristian Foral (NU Technologies)

Claudiu Birlogeanu (CAD Works)

Ciprian Onetiu (3DDesign)

Narcis Barbarii (PRO-4DFORM)

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Representatives on behalf of the City hall institution, SMEs, R & D sector

City hall representatives (Cluj-Napoca)

Mayor of Cluj-Napoca city, Emil Boc

Emilia Botezan

Oana Buzatu

SMEs representatives, clusters and Developing Agencies

Cristian Otgon (North West Developing Agency, RO)

Laviniu Chis (North West Developing Agency, RO)

Bianca Muntean (Transilvania IT cluster)

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Representatives of disseminating Publishing Houses

MDPI Romania

HR Manager Irina Pelin

Ms. Anca Banu

IntechOpen, UK

Head of Publishing operations, Danijela Duric

Ms. Mirta Benvin

Ms. Milica Mataja-Mafrici

Ms. Milica Abeer

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BRIGHT consortium partners (coordinators)

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Prof.dr.eng. Milos Simonovic, University of Nis, SRB

Prof.dr.eng. Remigiuz Labudski, Univ. of Poznan, PL

Prof.dr.eng. Peter Kostal, STU, Bratislava, SK

Prof.dr.eng. Sven Maricic, Juraj Dobrila University, Istria, HR

Bransilav Rabara, BIZZCOM s.r.o., Bučany, SK

Mate & Senka Babic, B. M. Plast d.o.o, Optaija, HR

BRIGHT ERASMUS KA 226 project

BRIGHT Special Thank You addressed to all of you
& looking forward to meet you on the next events organized
within BRIGHT project & next edition of summer school in July 2022

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