Multiplier Event on the Experiencing of e-Learning Platform for Biomechatronics,

hosted by Bizzcom s.r.o. company, in Bucany, Slovakia 13th September 2023

This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA · UNIVERSITATEA POLITEHNICA DIN BUCUREȘTI 1818 · POZNAN UNIVERSITY OF TECHNOLOGY · UiA University of Agder · bizzcom

Iceland Liechtenstein Norway grants

Working together for a green, competitive and inclusive Europe

bizzcom

EMERALD: European network for 3D printing of biomimetic mechatronic systems
EEA & Norway Grant - Contract No. 21-COP-0019

MULTIPLIER EVENT on Experiencing of e-learning platform for bio-mechatronics

organized by BIZZCOM s.r.o. company, Slovakia

– Event agenda- 13th of September 2023

	Session 1 – EMERALD e-learning platform for bio-mechatronics
8:30	Registration of participants to the Multiplier Event
9:00	Opening and Welcome ceremony: Branislav Rabara – Director of BIZZCOM s.r.o. company (Slovakia)
9:15	EMERALD project overall presentation – progress, actions, KPIs, perspectives / details about the event – Associate Prof. Răzvan Păcurar (Technical University of Cluj-Napoca, Romania)
9:30	EMERALD main concept of the EMERALD e-learning platform for bio-mechatronics - Associate Prof. Răzvan Păcurar (Technical University of Cluj-Napoca, Romania)
9:45	EMERALD – e-learning platform for bio-mechatronics – presenting of CAD / CAE virtual laboratory room e-learning facilities - (Associate Prof. Răzvan Păcurar – Technical University of Cluj-Napoca - Romania)
10:15	EMERALD – e-learning platform for bio-mechatronics – presenting of 3D scanning and 3D printing virtual laboratory rooms e-learning facilities - (Associate Prof. Filip Gorski – Poznan University of Technology - Poland)
10:30	EMERALD – e-learning platform for bio-mechatronics – presenting of Testing and Materials characteristics virtual laboratory room e-learning facilities - (Associate Prof. Diana Băilă – University Politehnica Bucharest - Romania)
10:45	EMERALD – e-learning platform for bio-mechatronics – presenting of Sensoring, Programming and Assembling virtual laboratory rooms e-learning facilities - (Prof. Filippo Sanfilippo – University of Agder - Norway)
11:00	EMERALD – e-learning platform for bio-mechatronics – presenting of VR / AR virtual laboratory room e-learning facilities - (Martin Zelenay – BIZZCOM - Slovakia)
11:15	Conclusions about the content and future perspectives on improving the use of the EMERALD – e-learning platform for bio-mechatronics/ realizing of bio-mechatronics systems to support people with special needs (amputated arms) (Technical University of Cluj-Napoca, Romania)
11:30	Coffee break / Press conference

AGENDA

bizzcom

	Session 2 – Experiencing the – EMERALD e-learning platform for bio-mechatronics / VR / AR / MR experience
12:00	Opening of the session and organizing aspects related to the EMERALD e-learning platform for bio-mechatronics experiencing / dividing in groups (Martin Zelenay – BIZZCOM (Slovakia)
12:15	Experiencing the virtual rooms of the EMERALD e-learning platform for bio-mechatronics (testing on the computer) / Experiencing of VR applications using VR googles / Experiencing AR applications using tablets /collection of feedbacks (all partners + participants to the Multiplier Event)
13:15	Conclusions about the experiencing of the EMERALD e-learning platform for bio-mechatronics and discussions related to feedbacks /aspects that are still necessary to be improved in the e-learning platform / round table discussions (Martin Zelenay – BIZZCOM (Slovakia)
13:45	Comments and discussions on the possibility of joining different projects / consortium / EU Networks - Branislav Rabara – Director of BIZZCOM s.r.o. company (Slovakia)
14:15	Closing words / ending of Multiplier Event
14:30	Lunch break

This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

EMERALD – e-learning platform for bio-mechatronics – presenting of CAD / CAE virtual laboratory room e-learning facilities

TUCN

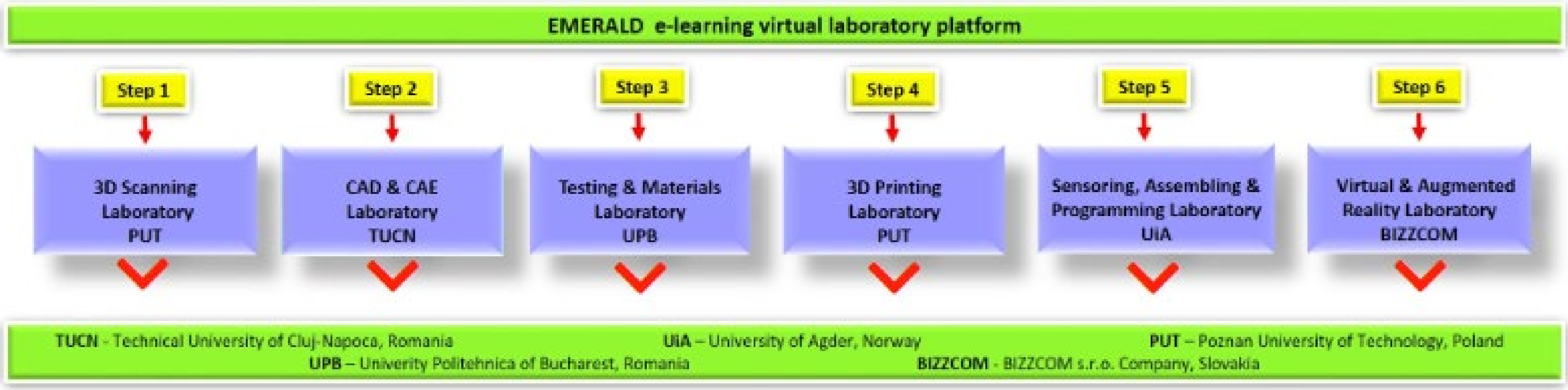
This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD

HOME PROJECT REPORTS DISSEMINATION INTELLECTUAL OUTPUTS EVENTS PARTNERS VIRTUAL LABS CONTACT

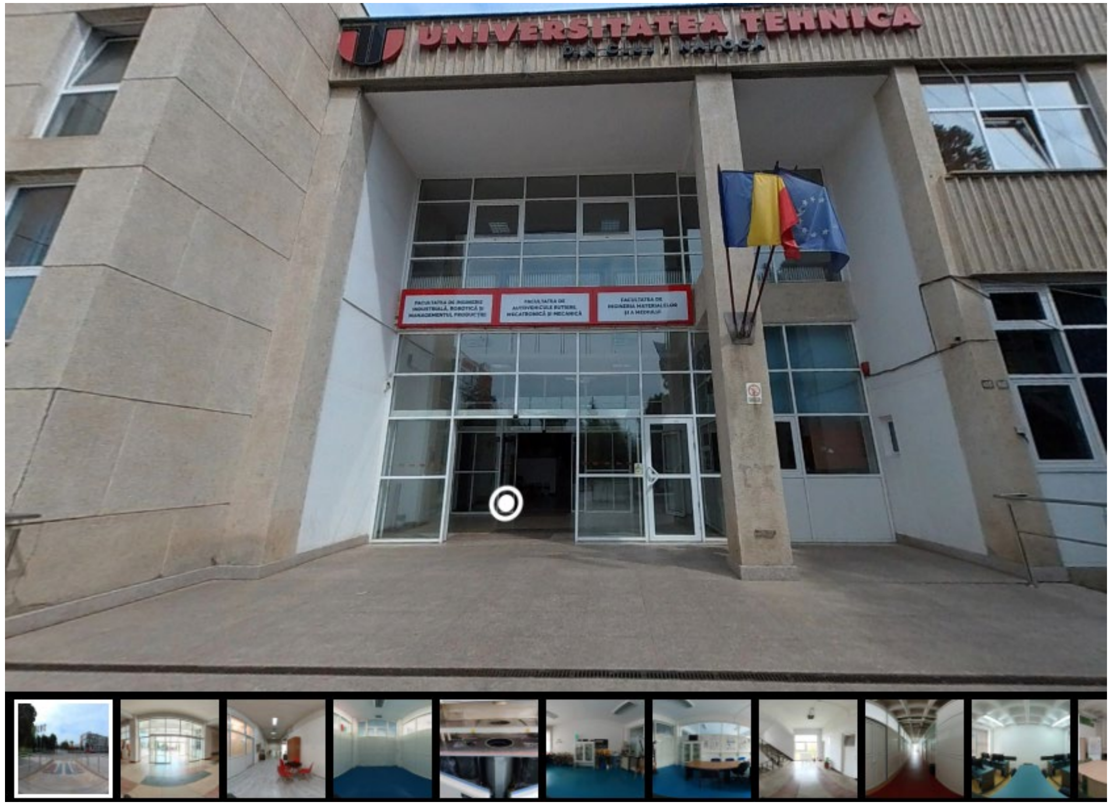
Please click on the tooltips on the diagram bellow to virtually visit our laboratories.

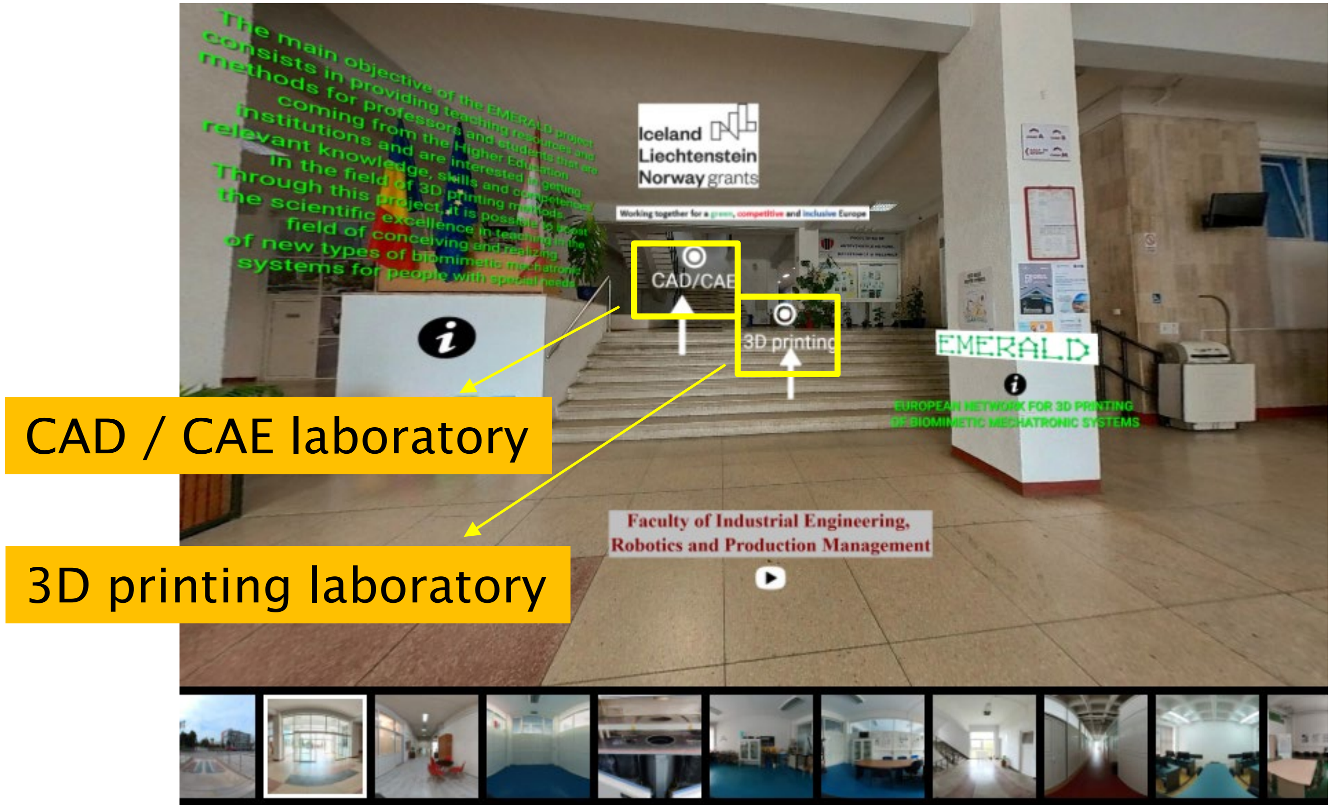
For a better understanding of the EMERALD e-learning virtual laboratory platform, which includes 3D scanning, CAD, CAE, testing and material characterization, 3D printing, sensorizing, assembly, programming, AR & VR, it is advisable to access the virtual laboratories by following the steps that are outlined in the diagram given below. By following the steps in the indicated order, this will lead to a more comprehensive understanding of the logical process involved in conceiving and developing of new biomimetic mechatronic systems to be realized utilizing 3D printing technologies.



This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

EMERALD VIRTUAL E-LEARNING PLATFORM – TUCN UNIVERSITY LABORATORIES



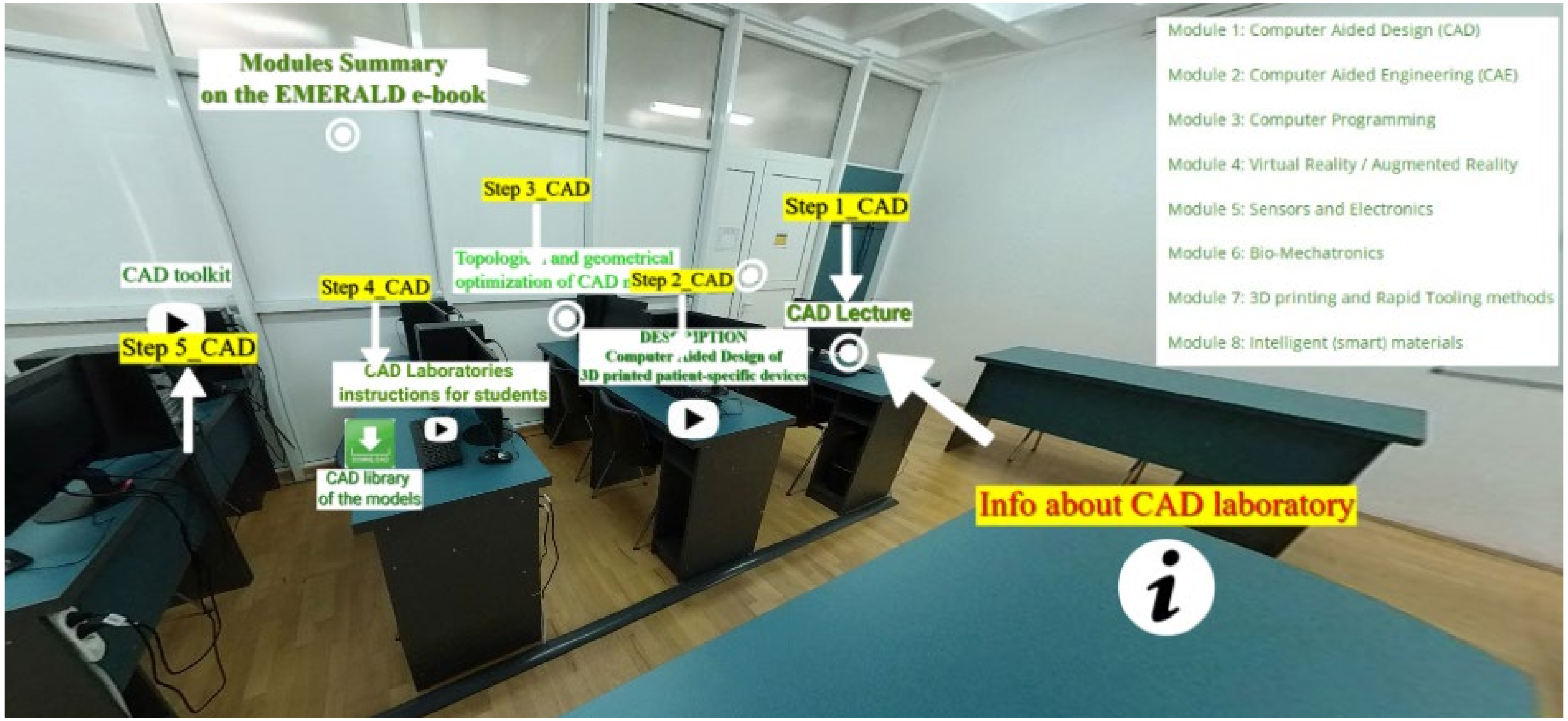


This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD

CAD / CAE LABORATORY

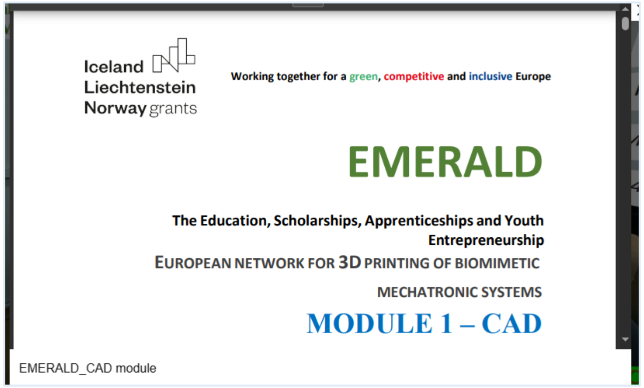
CAD STEPS



This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA ROMANIA
UiA University of Agder
bizzcom

CAD STEPS



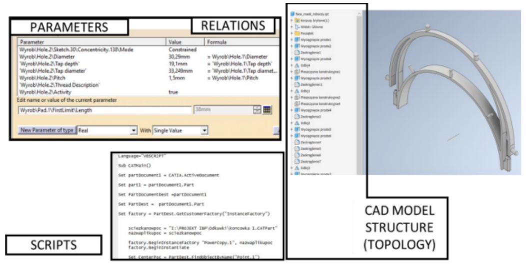
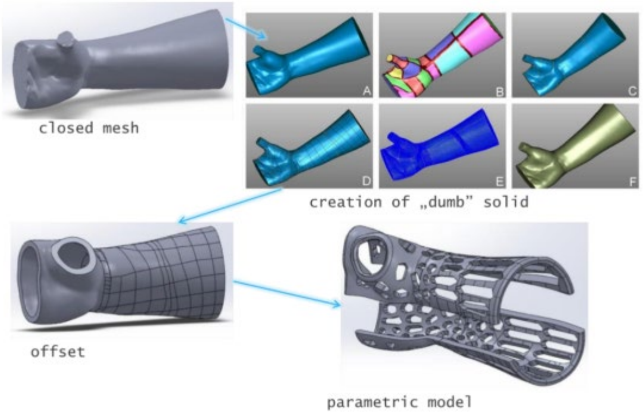
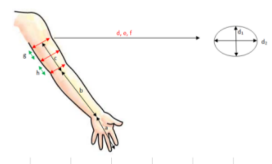
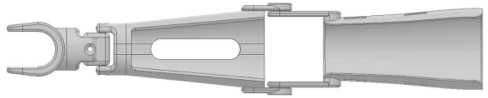


Figure 3.5 Basic ideas of intelligent CAD models [Górski 2021]



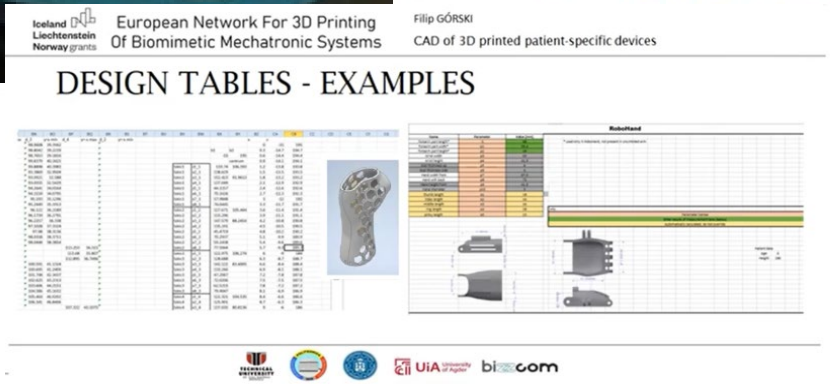
name	dimension	unit	
X1	110	mm	hand length "a"
X2	112	mm	don't change
X3	78	mm	don't change
X4	70	mm	don't change
promien_wew_C	17	mm	handle radius, don't change
wymiar_b	160	mm	forearm length (healthy limb)
wymiar_c	100	mm	arm length (stump)
wymiar_d1	70	mm	arm section 1 - bbox size y
wymiar_d2	60	mm	arm section 1 - bbox size x
wymiar_e1	60	mm	arm section 2 - bbox size y
wymiar_e2	60	mm	arm section 2 - bbox size x
wymiar_f1	60	mm	arm section 3 - bbox size y
wymiar_f2	55	mm	arm section 3 - bbox size x
odsunięcie	23	mm	offset value at the elbow

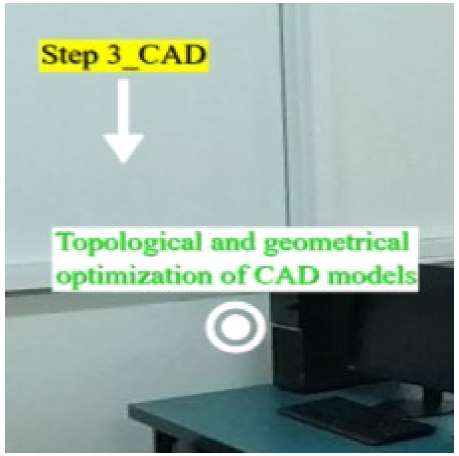


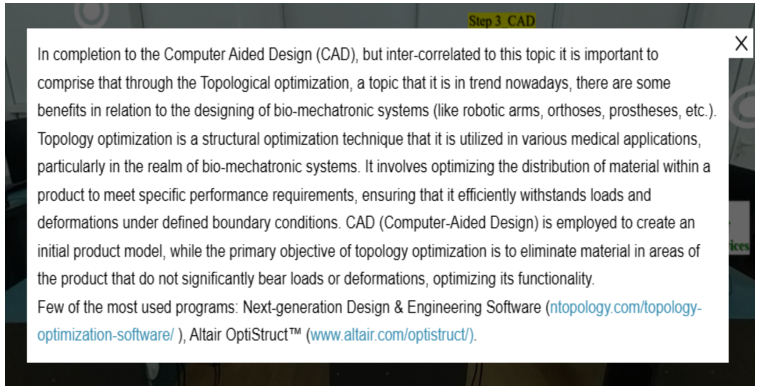


This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

CAD STEPS

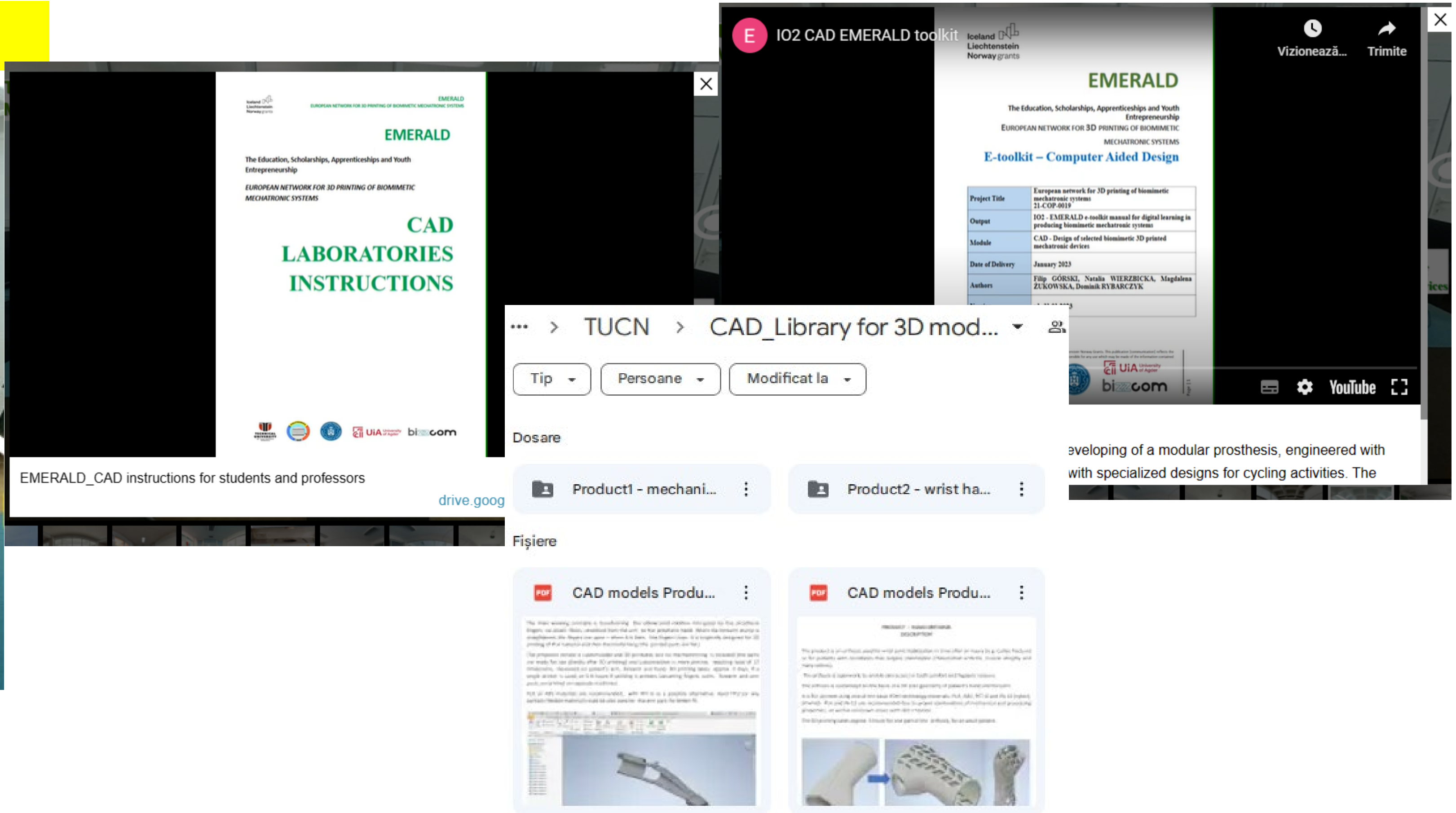




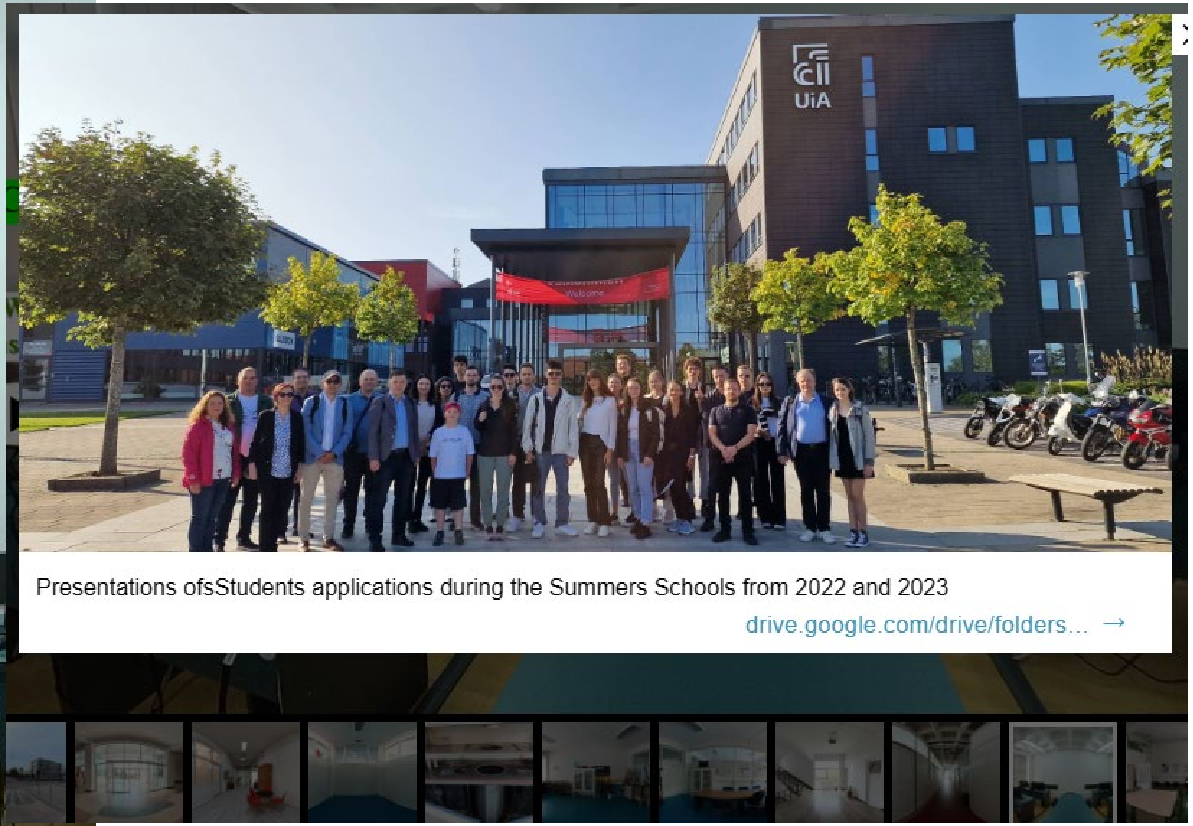


This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

CAD STEPS

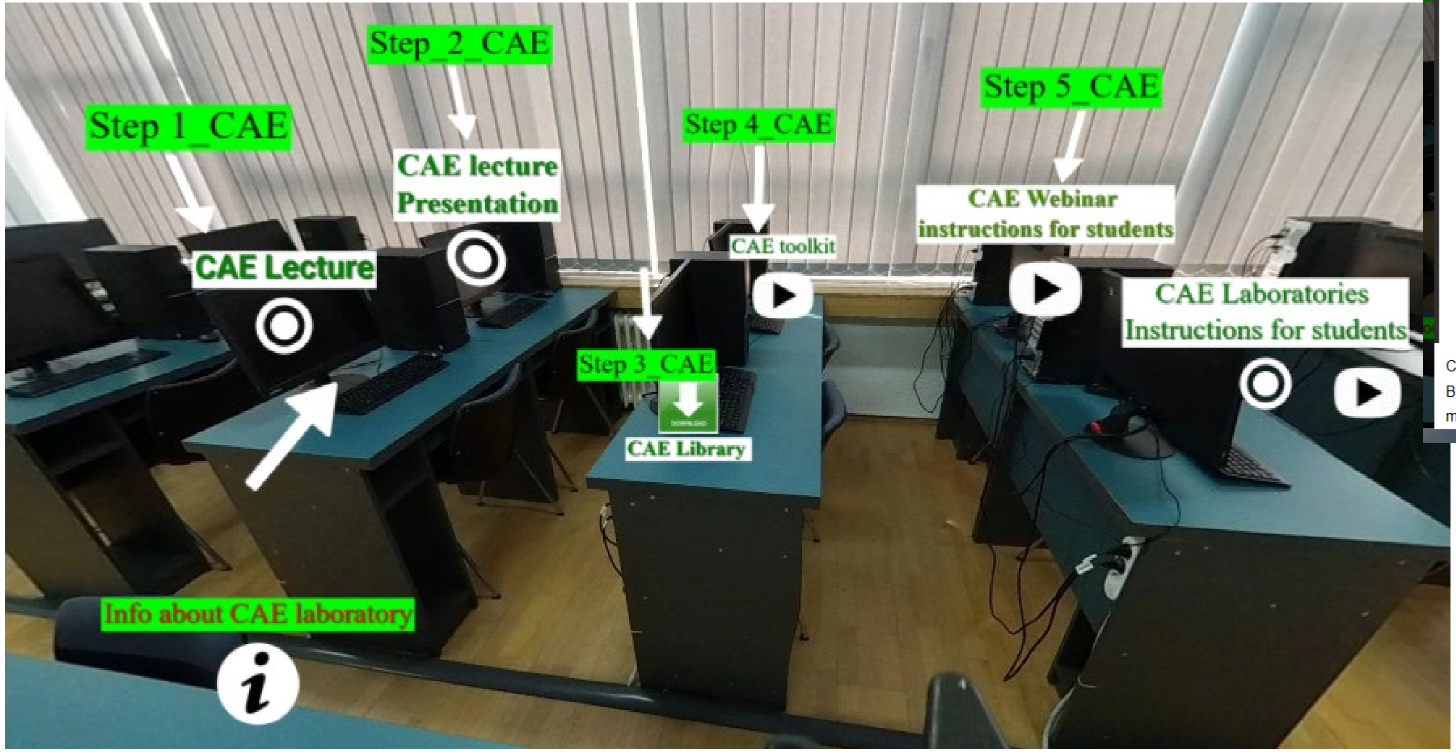


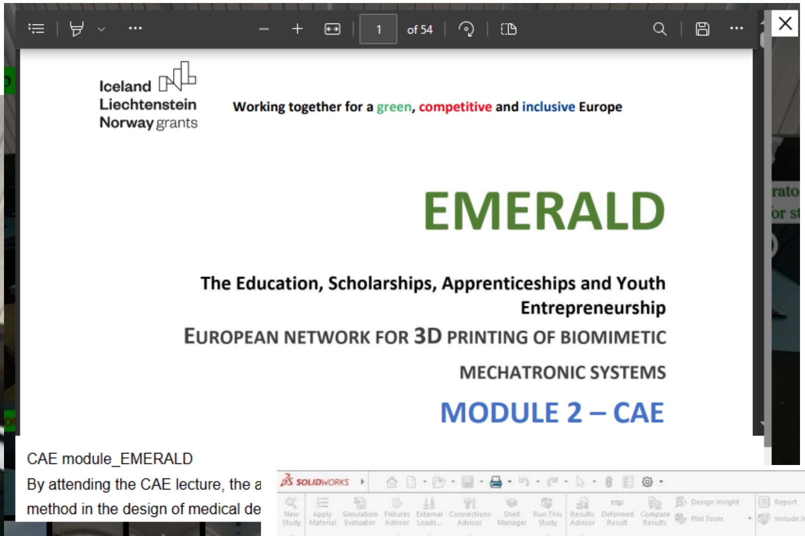
This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)



This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

CAE STEPS





Iceland Liechtenstein Norway grants

Working together for a green, competitive and inclusive Europe

EMERALD

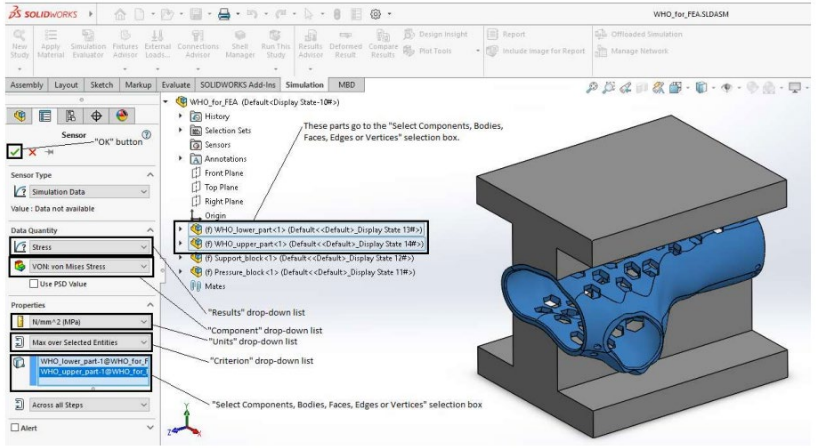
The Education, Scholarships, Apprenticeships and Youth Entrepreneurship

EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS

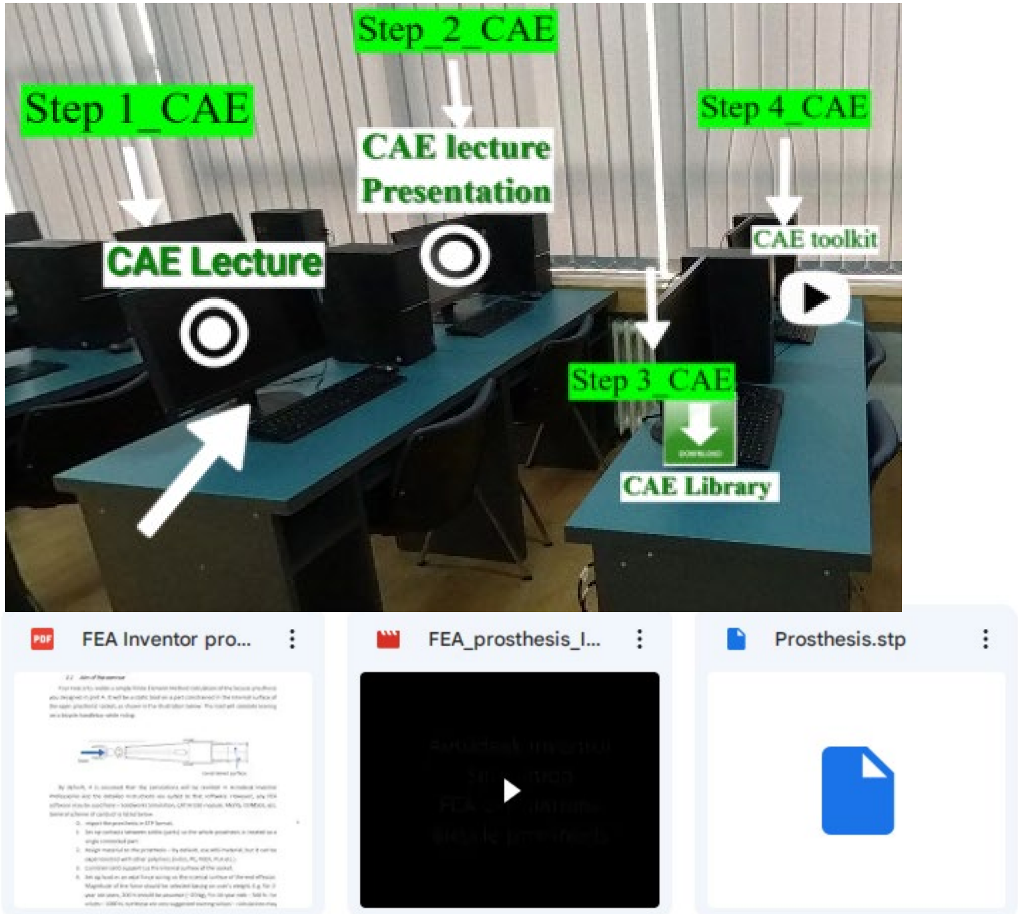
MODULE 2 – CAE

CAE module_EMERALD

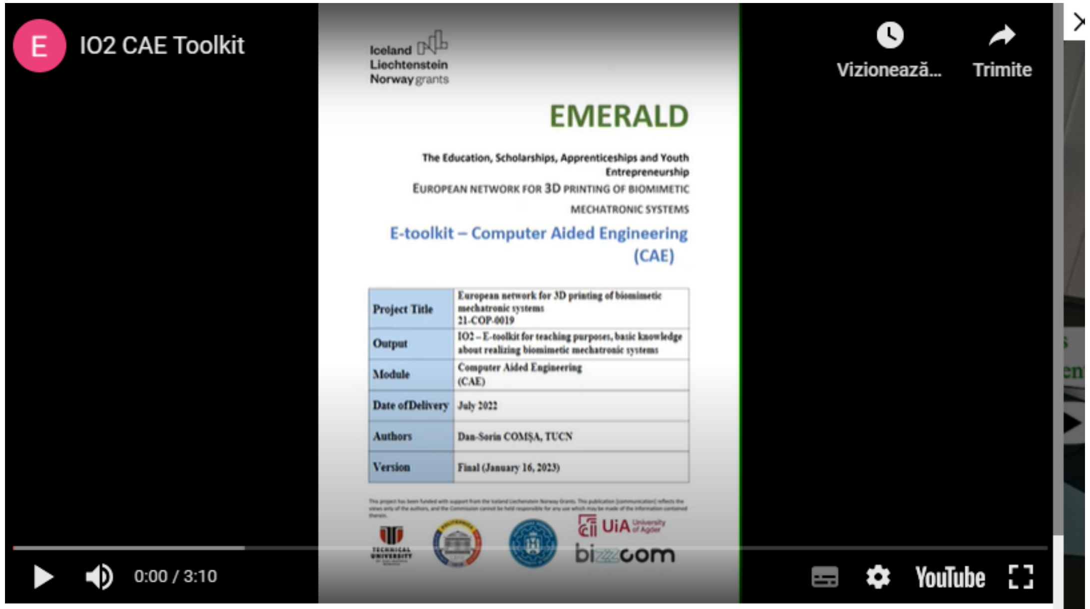
By attending the CAE lecture, the a
method in the design of medical de



This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

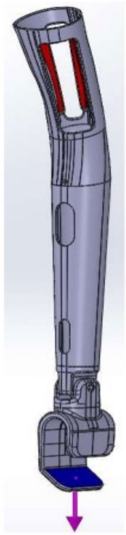


CAE STEPS



EMERALD CAE_toolkit

The provided description in the toolkit manual concerning the computer-aided engineering (CAE) analysis, specifically using SolidWorks Simulation was oriented on the analysis of upper-limb prosthesis that has been



This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

CAE STEPS

European network for 3D printing of biomimetic mechatronic systems

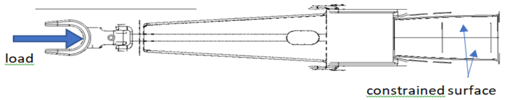
CAE laboratory instructions

Steps for CAE simulation

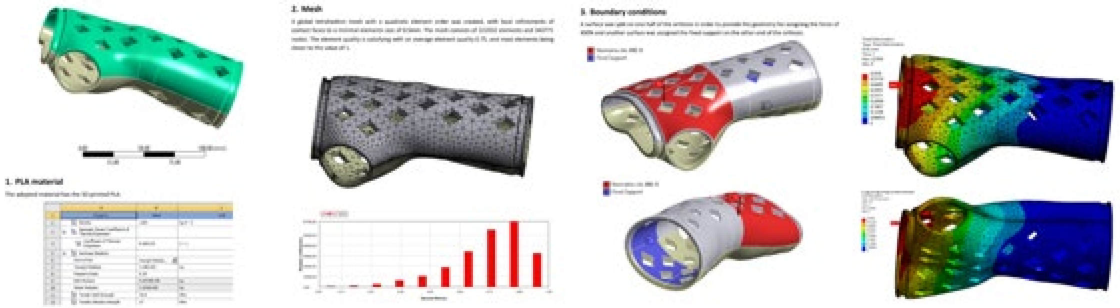
Practical Laboratory – calculations of hand prosthesis using Inventor and finite element analysis

1.1 *Aim of the exercise*

Your task is to realize a simple Finite Element Method calculation of the bicycle prosthesis you designed in part A. It will be a static load on a part constrained in the internal surface of the open prosthetic socket, as shown in the illustration below. The load will simulate leaning on a bicycle handlebar while riding.



By default, it is assumed that the calculations will be realized in Autodesk Inventor Professional and the detailed instructions are suited to that software. However, any FEA software may be used here – Solidworks Simulation, CATIA GSE module, ANSYS, COMSOL,

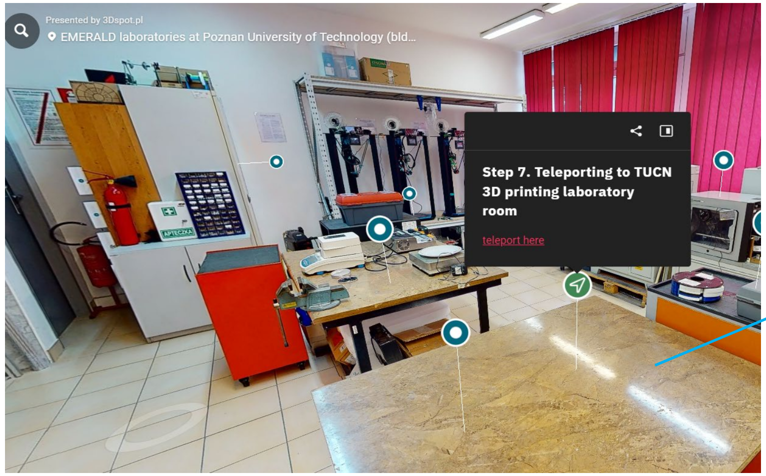


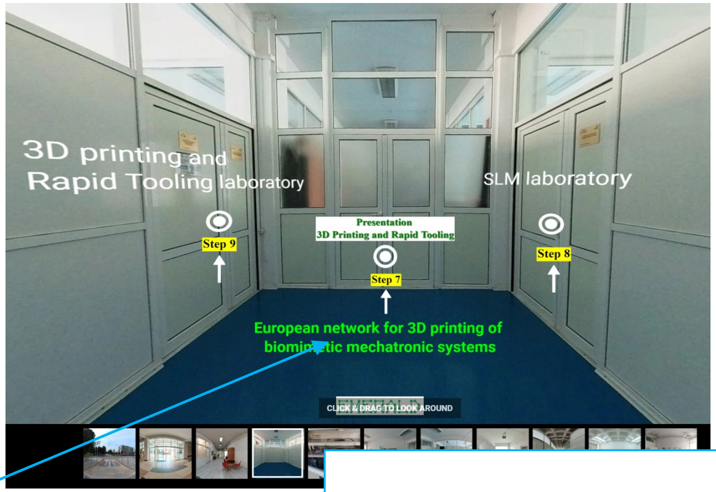
Example of report that can be found on the library of work done by students

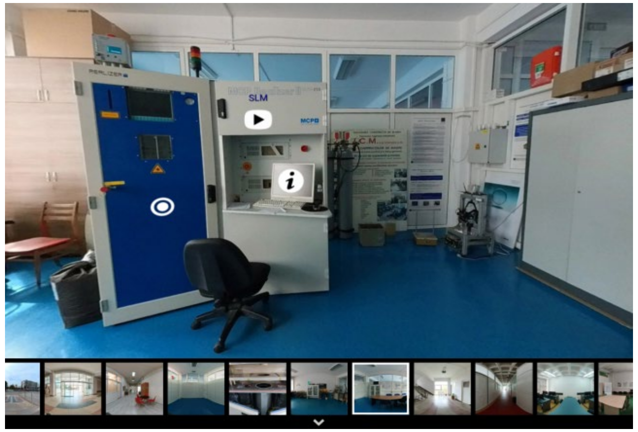
This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

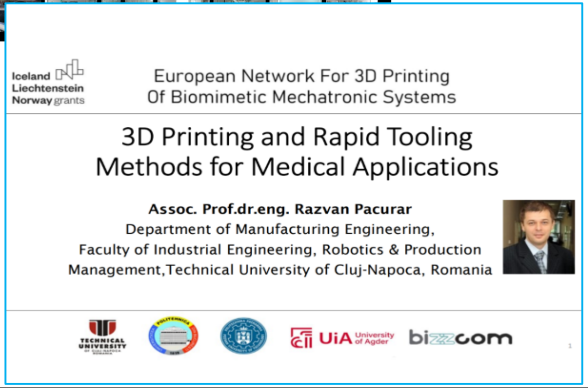
EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD

ADDITIONAL RESOURCES ON 3D PRINTING PROVIDED BY TUCN








Iceland Liechtenstein Norway grants

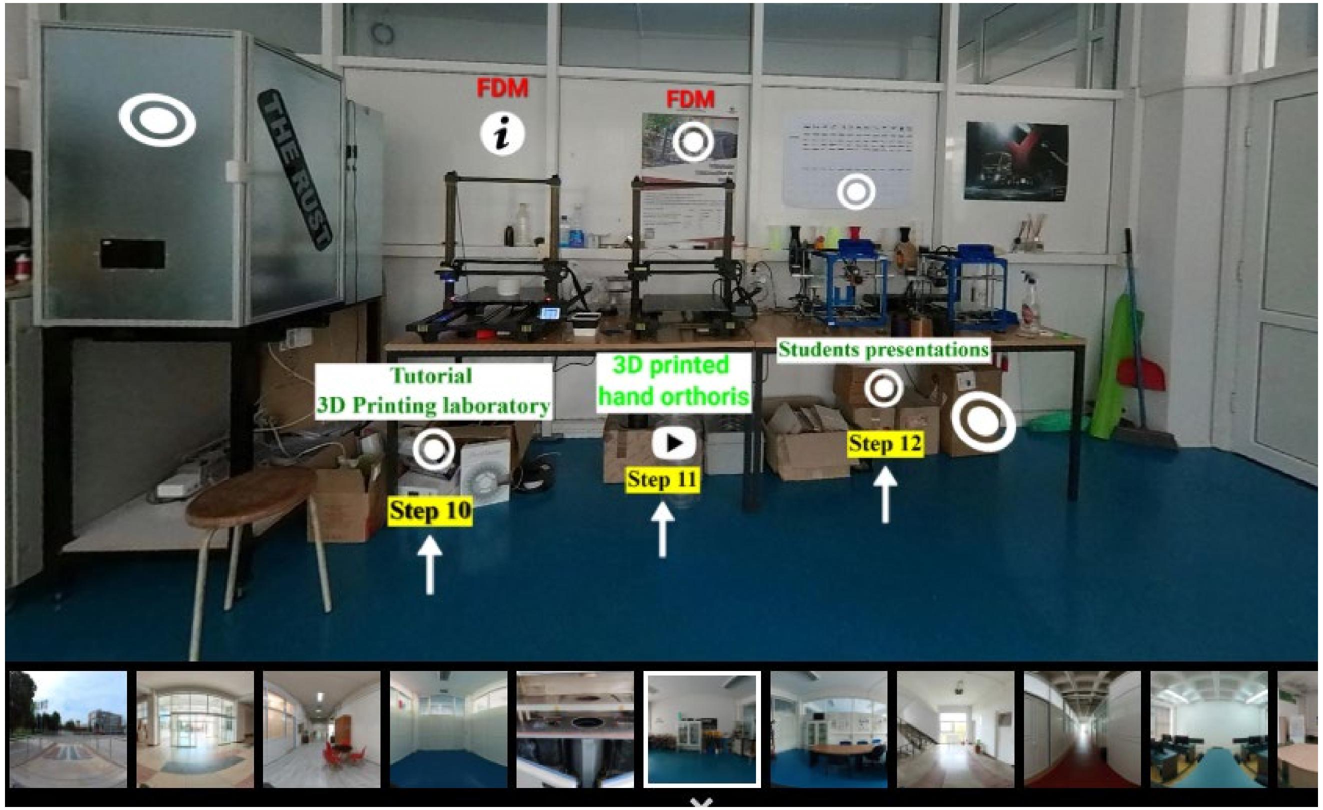
European Network For 3D Printing Of Biomimetic Mechatronic Systems

3D Printing and Rapid Tooling Methods for Medical Applications

Assoc. Prof.dr.eng. Razvan Pacurar
Department of Manufacturing Engineering,
Faculty of Industrial Engineering, Robotics & Production Management,Technical University of Cluj-Napoca, Romania

This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

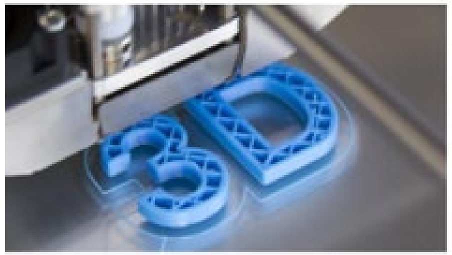
EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD



Good practice examples realized by the students using the EMERALD 3D printing resources of virtual laboratory of the e-learning platform

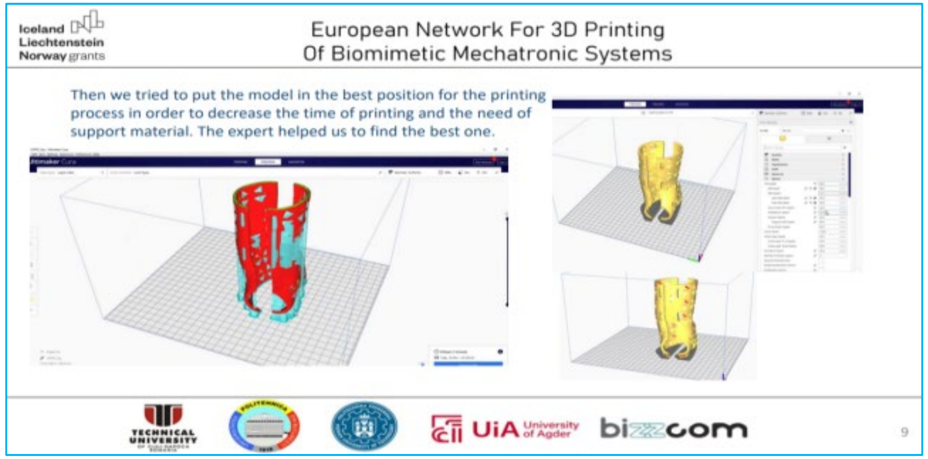
summer school 2022

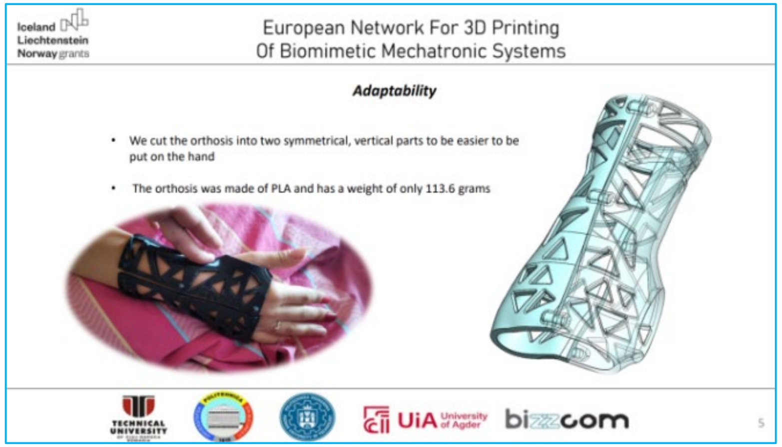
3D Printing Laboratory

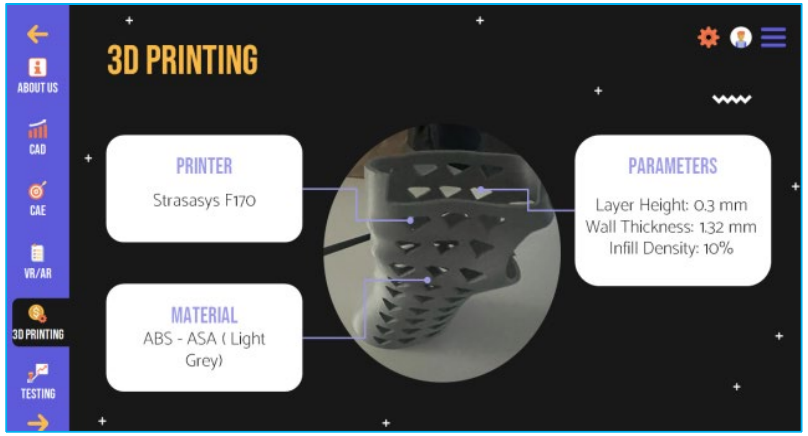


This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD







This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)

CONCLUSIONS

As one may notice concerning the CAE virtual laboratory of the EMERALD e-learning platform , teaching resources that have been provided by the EMERALD consortium aims not just to provide the users (students) only the basics and theoretical knowledge about CAE analyses following CAD step, but aims to stimulate them through the provided laboratory educational resources (toolkit laboratory, CAE instructions, tutorials, videos, CAE library, etc.) to get practically involved in performing the CAE analyses of specific bio-mechatronic components (like orthoses or prostheses) for people with amputated arms that have been realized in the previous step by CAD, with the main aim of understanding how a CAD variant and one type of material (among more that can be selected) can be validated in the end in concordance with the functionality /mechanical characteristics of the realized parts. Laboratory toolkit and provided tutorials, as well as the instructional videos are highly practical, providing the users step by step information data on how they have to do the CAE analyses of specific bio-mechatronic components for people with amputated arms (like orthoses, prostheses), guiding in this way the users (students) to go through the essential steps of a CAE analysis to be realized for specific models to be made of different types of materials like ABS, PET-G or PLA by 3D printing, building on the knowledge acquired from the introductory courses.

This results was realised with the EEA Financial Mechanism 2014-2021 financial support. Its content (text, photos, videos) does not reflect the official opinion of the Programme Operator, the National Contact Point and the Financial Mechanism Office. Responsibility for the information and views expressed therein lies entirely with the author(s)