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DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE

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## 1 Introduction

This report details the actions carried out by DigiFoF partners from joint academia-industry point of view in the first year of DigiFoF project. The evaluated actions were proposed and described in detailed in the D5.1 deliverable (Action plan on joint academia-industry initiatives).

DIGIFoF partners carried out all planned actions proposed in the action plan. Information about these activities taken in the period 01.2019-12.2020 (24 month) are given in details in the next section of the report. It contains a separated section for each national note of academic/industrial partnerships, with actions that was taken in the covered period regarding collaborations between academy and industry in the DigiFoF project.

## 2 EMSE&CLEXTRAL: List of joint academia-industry actions

### 2.1 Online and face-to-face trainings and Webinar

#### 2.1.1 Actions provided by EMSE

EMSE contributes to the following two webinars in 2019. The second webinar on 12.02.2020 is realized in collaboration with CIRIDD.

**Table 2.1. EMSE online and face-to-face trainings and Webinar**

Training/webinar topic	Presenter	Date	Qualitative results
DigiFoF webinar #2 - Introduction and research interest of each Laboratory	Xavier Boucher, EMSE	07.10.2019	Information available on the web.
DigiFoF webinar #9: Circular Economy approach in servitization	Coralie Neyrand, CIRRID Nadine Dubruc, EMSE	12.02.2020	Information available on the web, and reusable for teaching purposes.
French DigiFoF Webinar Industrie du futur: comment associer la personnalisation de masse et l'agilité des systèmes de production ?	Khaled Medini EMSE Xavier Delorme EMSE Arnaud Bocquillon CIMES	12.06.2020	Material and video reusable for industrial training, available on the web via French partners (CIMES and other websites)
DigiFoF Webinar #15 Convergence between mass-customisation and industrial agility	Xavier Boucher EMSE Khaled Medini EMSE Xavier Delorme EMSE Arnaud Bocquillon CIMES	08.09.2020	Information available on the web, and reusable for teaching purposes.

### 2.2 Lectures (series) in academia and industry

#### 2.2.1 Actions provided by EMSE

Ecole Nationale Supérieure des Mines de Saint Etienne (EMSE) provides the following lectures in academia. These lectures target engineering students from different disciplines to make them familiar with various aspects of FOF.

**Table 2.2. EMSE lectures (series) in academia and industry**

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
Security and health management for Digital FoF	Nadine Dubruc	April 2019	6	Awareness of occupational health and safety as part of organizational change
NEMO 2019	Xavier Boucher	July 2019	50	Knowledge transfer re-used by PhD students; practical exercises re-used for other teaching purposes
Industry 4.0 in master MIT	Elaine Mosconi	October 2019	10	Development of industrial & academic international collaborations on industry 4.0
Business process management using OMILAB	Xavier Boucher	October 2019	28	Teachings programmed yearly. Internships on BPR proposed to students.
PSS design in industrial transition	Xavier Boucher	November 2019	13	Teachings programmed yearly. Proposal of specific industry 4.0 projects to students.

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
Life-cycle integration and management	Xavier Boucher	November 2019	6	Teachings programmed yearly.
Enterprise modelling and design using OMILAB	Xavier Boucher	December 2019	4	Teachings programmed yearly. Later use of OMILAB by students in research activities.
Operationalizing Circular Economy by means of Product-Service System (PSS)	Elaheh Maleki	February 2020	15	This program made engineering students familiar with circular servitization in industry. Canceled because of covid 19
Business process management using OMILAB	Xavier Boucher	November 2020	43	Teachings programmed yearly (ICM – GPL Students). Internships on BPR proposed to students.
PSS design in industrial transition	Xavier Boucher	October 2020	16	Teachings programmed yearly (ICM – LMRI Students). Proposal of specific industry 4.0 projects to students.
Life-cycle integration and management	Xavier Boucher	December 202	7	Teachings programmed yearly (Master MTI).
Enterprise modelling and design using OMILAB and ADOXX	Khaled Medini	December 2020	4	Teachings programmed yearly. Later use of OMILAB by students in research activities.

### 2.2.2 Actions provided by Cletral

Cletral is actively in collaboration with EMSE in realizing knowledge exchange between industry-academia. In 2019 and 2020, Cletral gave the following lectures in EMSE.

**Table 2.3. Cletral lectures (series) in academia**

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
International Management	Gilles Maller	April 2019	24	Transfer of industrial expertise towards engineering students- Yearly teaching.
International Strategy	Gilles Maller	May 2019	24	Transfer of industrial expertise towards engineering students Yearly teaching.
International Management	Gilles Maller	April 2020	24	Transfer of industrial expertise towards engineering students- Yearly teaching.
International Strategy	Gilles Maller	May 2020	24	Transfer of industrial expertise towards engineering students- Yearly teaching.

## 2.3 Invited talks both in academic and industrial settings

### 2.3.1 Actions provided by EMSE

EMSE continuously invites professionals from different research institute and industrial companies to discuss on various subjects. However the year 2020 was quite impacted by the COVID situation, with cancellation of several events. The following talks are organized.

Table 2.4. Invited talks both in academic and industrial settings

Topic	Presenter	Date	Participants	Qualitative results
Digital transformation and circular Economy	PRIMETAL, Y.Fontaine	May 2019	50	Mutual exchanges between academic and industrial, on digital orientations for industry of the future
Digital transformation and circular Economy	EPE, C. Tutenuit	May 2019	50	Mutual exchanges between academic and industrial, on digital innovation for circular economy
Industry 4.0	Sherbrooke university (CAN)	October 2019	10	International Exchange of expertise on industry of the future
PSS and sustainability	ECOBEL, JP.Bosles	October 2019	25	Transfer of industrial expertise towards engineering students
Management of Product-Services Strategies	BIELIEFELD University (DE)	February 2020	8	International exchange of expertise on industry of the future. Professional training for students.
Sustainability and Service-oriented Strategies	ECOBEL, JP.Bosles	October 2020	17	Transfer of industrial expertise towards engineering students

## 2.4 Internships (e.g. Erasmus+ / student internships)

### 2.4.1 Actions provided by EMSE

EMSE supports student internship and provides trainings for Erasmus+. In the context of Erasmus+, EMSE organize courses focusing on different aspects of Product-Service System (PSS)

**Table 2.5. Internships provided by EMSE – Erasmus+**

Erasmus+						
Teacher Name	Specialization	Year study	Start date	Organising Company	Participants	Qualitative results
Xavier Boucher	PSS design	PhD	July 2019	University of Vienna	50	Transfer of expertise on PSS Design
Thomas Suesse	PSS management	Final year of Master	February 2020	EMSE	15	Transfer of expertise on PSS management
Thomas Suesse	PSS management	Final year of Master	January 2021	EMSE	8	Transfer of expertise on PSS management
Xavier Boucher	Environmental assessment of PSS	Master I	January 2021	EMSE	1	Erasmus+ Semestrial Exchange

**Table 2.6. Internships provided by EMSE for students**

Student internships					
Student Name	Specialization	Year study	Start date	Organising Company	Qualitative results
Roua Allaoui	Data analysis for industrial and commercial strategy	Final year of Master	May 2019	Clextal	Report on the status and history of different machines.
Thibault Gourdon	Studying the market of second hand extrusion machine	Final year of Master	October 2019	Clextal	Report on the status and history of second-hand machines.
Elisabetta Arboscelli	Smart PSS design	Master I	January 2021	Elm Leblanc	Contribution to a design method
Abir Belcaid	PSS project management	Master I	October 2019	CETIM	Audit for PSS innovation projects
Abir Belcaid	PSS project management	Master I	February 2019	ERE 43	Economic model for PSS assessment method
Bruno Mokbel	Servitisation of manufacturing Systems	Master I	February 2019	EMSE	Method for production system reconfiguration
Constantin ROUSSEAU	Digitalisation of manufacturing Systems	Master I	February 2019	EMSE	Method for production system reconfiguration
Jean Philippe Vouhé	Reconfigurability of manufacturing Systems	Master I	February 2020	EMSE	FRAMEWORK FOR RECONFIGURABLE MANUFACTURING SYSTEMS DECISION-MAKING

Marghrita DIB	Management of Circular Economy for industry of the future	Master I	October 2020	Cletral	Industrial management of product renovation processes
Julien BECOT	Commercial offers for second-hand Machinery	Master I	October 2020	Cletral	Innovation and marketing strategy for product renovation
Mouhammad Fawaz	Human resources and empowerment	Master	November 2020	EMSE	Report on HR tools encouraging empowerment

### 2.4.2 Actions provided by Cletral

Cletral collaborates with EMSE to support master students during their internship. During 2019, Cletral worked with students from EMSE on 2 subjects to take primary steps to adopt a new business in the context of FOF.

**Table 2.7. Internships provided by Cletral**

Item	Student Name	Specialization	Year study	Start date	Organising Company	Qualitative results
1	Roua Allaoui	Data analysis for industrial and commercial strategy	Final year of Master	May 2019	Cletral	Report on the status and history of different machines.
2	Thibault Gourdon	Studying the market of second hand extrusion machine	Final year of Master	October 2019	Cletral	Report on the status and history of second-hand machines.
3	Marghrita DIB	Management of Circular Economy for industry of the future	Master I	October 2020	Cletral	Industrial management of product renovation processes
4	Julien BECOT	Commercial offers for second-hand Machinery	Master I	October 2020	Cletral	Innovation and marketing strategy for product renovation

## 2.5 Bachelor, Master, PhD thesis project

### 2.5.1 Actions provided by EMSE

Currently, EMSE supervises the following two PhD thesis projects in collaboration with industrial partners. These thesis focus on PSS value chain and customization as the new business in the context of FOF.

**Table 2.8. Bachelor, Master, PhD thesis project coordinated by EMSE**

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	PhD	Andres-Camilo MURILLO-COBA	Design of PSS value chains for thermic systems	2019	ElmLeblanc
2	PhD	Omar-Ahmed-Mostafa EZZAT	Modularity for PSS customization	2019	Academic



Item	Thesis Type	Student Name	Project title	Year	Target companies
3	Master	Safae Diouri	Impact of digitalisation on manufacturing management	2019	WAVESTONE
4	Master	Bruno Mokbel	Validation of information system development in a digital context.	2019	Ernst & Young
5	Master	Mariam Lazrek	Management of innovation project portfolio	2019	NOVEANE
6	Master	Ralph Pierrot	Management of Digital transformations	2019	SIA PARTNERS
7	Master	Eva Baguet	Impact of industry of the future on logistic management	2020	Manhattan Associates
8	Master	Violette Favret			
9	Master	Vinicios Mees	Supply Chain Management	2020	KELLOGG'S
10	Master	Salma Bouraoua	Industrial Innovation for product Development	2020	SAFRAN
11	Master	nicolas Van der laan	Logistic management	2020	Progress Management
12	Master	Pauline Goldery	Indicator Systems for Resilient industry	2020	Cranfield Univ.

## 2.6 Excursions (lab visits, industrial visits etc.)

### 2.6.1 Actions provided by EMSE

EMSE organizes visits for the French academia-industry network to make all partners familiar with the competencies and capabilities of each other. In the context of factory of the Future, EMSE organized the following visits.

Table 2.9. Excursions provided by EMSE

Item	Excursion Name / Excursion topic	Company(ies) visit	Date	Participants	Qualitative results
1	EMSE PSS research team	Cletral	June 2019	6	Presentation on the company equipment and competencies
2	French partners of DigiFoF	ITM Factory	April 2019	6	Presentation on Fayol Institute, ITM Factory, objectives of ITM Factory, and Visiting the equipment of ITM Factory

### 3 ULBS joint academy-industry action

In follow we will present actions carried out by ULBS partner in period 01.2019-12.2020 in the DigiFoF project. This report completes the actions undertaken by ULBS in 2019 with actions that were realized in 2020.

#### 3.1 Online and face-to-face trainings and Webinar

Members from ULBS contributed at four webinars in the two years of DigiFoF project, as was in proposed plan. Also, it took place (face-to-face until COVID-19 introduced restrictions – in March 2020 and online after that) a lot of vocational and professional trainings:

1. In 06.19.2019 webinar #1 with name “*Introduction to DigiFoF*” where Adrian Florea presented the actions that need to be carried out in the project and next steps in the project.
2. In 07.10.2019 webinar #2 with name “*Introduction and research interest of each Laboratory*” where colleague Ion Mironescu presented the general idea that will be integrated and develop in the white paper for this project.
3. In 23.04.2020 webinar #11, “*Computer Vision for Manufacturing Industry Application*” where our colleague prof. Remus Brad presented the idea of using modelling system in developing particular manufacturing system.
4. In 09.06.2020 webinar #13: “*Design and control of manufacturing processes in confectionery industry using ADOxx tools*” presented by Ion Mironescu.
5. In 22.01.2020 9 participants completed an academic training organised by ULBS entitled “*Workplace safety – Employees emotion recognition*”, trainer Eng. MSc. Valentin Fleacă.
6. In period 10.04.2019 – 12.04.2019 at ULBS was organised an academic training “*Sibiu – Smart city modelling (ADOxx)*”, trainer Eng. Victor Dobrilă.
7. In period 15.06.2020 – 26.06.2020 at ULBS was organized a vocational training for Continental Sibiu employees, entitled “*Workplace safety – Employees emotion recognition*” where 7 participants finished.
8. In 30.07.2020 other 28 participants completed a vocational training organized by ULBS for Continental Sibiu employees, entitled “*Workplace safety – Employees emotion recognition*”, trainer Eng. MSc. Valentin Fleacă.
9. In period 5.10.2020 – 23.11.2020 was organised a vocational training entitled “*Workplace safety – Employees emotion recognition*” where 23 participants finished.

#### 3.2 Lectures (series) in academia and industry

In 2019 ULBS have 2 students participating at NEMO 2019 in period 15-27.06.2019 – MUNTEAN Maria and BALTES Octavian Isaia and 1 participant (Victor DOBRILĂ-member of ULBS team in DigiFoF) at the training course at Vienna “*Introduction to ADOxx*” that took place in period 10-12.04.2019. Due to COVID-19 restrictions in 2020 the NEMO summer school was cancelled, and the mobilities of the people were limited.

### 3.3 Invited talks both in academic and industrial settings

In 17.05.2019 in the context of “Hardware and Software Engendering” event organised by Engineering Faculty from ULBS took place the presentation “Research problems at CONTINENTAL Sibiu” exposed by Langa Remus from Continental Automotive System. (<http://csac.ulbsibiu.ro/hse.php>)

In 22.05.2019 in the event of “Marquardt Schaltsystems” organised at Engineering Faculty ULBS, Anda Antonescu have a presentation called “The R&D expansion plan of Marquardt Sibiu: Intelligence Opens Doors to New Possibilities”. Detailed about the event <http://inginerie.ulbsibiu.ro/fara-categorie/marquardt-schaltsysteme-s-c-s-university-event-22-05-2019/>

In period 4-15.11.2019 took place the event “Continental alături de tine în Facultate” where was organized a lot of workshops by employers of Continental for the students and professors from Engineering Faculty

- “Assisted driving Autosar playground”,
- “Network devices and seat control”,
- “Electrical engineering for safety”,
- “Finite element analysis high performance computing”,
- “U.R. - from zero to hero!”,
- “Cybersecurity live - penetration testing”.

The detailed program is on [http://inginerie.ulbsibiu.ro/wp-content/uploads/2019/10/Promovare\\_Conti-Attractive-ULBS.pdf](http://inginerie.ulbsibiu.ro/wp-content/uploads/2019/10/Promovare_Conti-Attractive-ULBS.pdf)

In 26-27 November 2020 will took place at the “Lucian Blaga” University of Sibiu the event “Sibiu Innovation Days” where is organised a lot of workshops by employers of European Commission and different companies from Sibiu, Cluj Napoca, Timisoara and Bucharest. The panels and presentations related to DigiFoF project are presented in the next table:

Lecture name	Speakers	Company
<b>A user story, in the context of Industry 4.0</b>	Valean Ioan	WEBfactory GmbH
<b>Digitalization / Industry 4.0 in the context of cloud and distributed systems</b>	Sebastian Negomireanu	WEBfactory GmbH
<b>Industry 4.0: Cobots &amp; AGVs impact in industry</b>	Alexandru Bian	Continental Automotive Systems
<b>SAP HANA as the architecture for fast data processing</b>	Mark Hollaender	BearingPoint Software Solutions GmbH, Germany
<b>Reporting evolution from a physical signed paper towards granular data accessibility</b>	George Bontas	BearingPoint Software Solutions SRL
<b>Research and innovation for Europe’s digital decade</b>	Ana Luísa Correia	European Commission
<b>Survival of the fittest through disruptive changes</b>	Klaus-Georg Schmidt	Alfa-Horizont GmbH, Germany

<b>Future of work - the human connection</b>	Daniel Reisenauer	Visma Software S.R.L
<b>The future of work: humans and machines</b>	Iris Diaconescu	Continental Automotive Systems
<b>Workforce skills and jobs of the future</b>	Lukas Borunsky	European Commission
<b>From Business Continuity to Business Resiliency</b>	Sergiu-Valentin Dilimot	Visma Software S.R.L
<b>Why Agile in home office works – challenges and solutions</b>	Cristi Cimpineanu	IT Perspectives

The detailed program is on <https://events.ulbsibiu.ro/innovationdays/>

### 3.4 Internships (e.g. Erasmus+ / student internships)

In the partnership between ULBS and companies around Sibiu some of the students go into companies to make practice in the internship period (in July). In the Table 1\_ULBS is presented a list with these students that made practice in the DigiFoF domain.

Table 3.1. List of ULBS students who made practiced in Continental Automotive System Sibiu

Item	Student Name	Specialization	Year study	Start date
1	Anghel Adrian	Electromechanics	III	08.07.2019-26.07.2019
2	Badiu Bogdan Vasile	Multimedia Systems Engineering	II	08.07.2019-26.07.2019
3	Bardasu Maria Roxana	Multimedia Systems Engineering	III	08.07.2019-26.07.2019
4	Berbecel Adina	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
5	Bianca Mosor	Computer science and Computer Engineering	III	08.07.2019-26.07.2019
6	Bratu Mioara	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
7	Diac Rares Dumitru	Multimedia Systems Engineering	III	08.07.2019-26.07.2019
8	Dobre Elvis Marin	Applied Electronics	III	08.07.2019-26.07.2019
9	Draghici Gabriel Constantin	Applied Electronics	II	08.07.2019-26.07.2019
10	Dragomir Darian	Multimedia Systems Engineering	II	08.07.2019-26.07.2019
11	Dragut Roxana Diana	Applied Electronics	III	08.07.2019-26.07.2019
12	Drumar Radu	Applied Electronics	II	08.07.2019-26.07.2019
13	Filip Cristian	Applied Electronics	II	08.07.2019-26.07.2019
14	Fratila Ionut	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
15	Gurau Florin Adrian	Information Technology	II	22.07.2019-9.08.2019

Item	Student Name	Specialization	Year study	Start date
16	Hertoiu Bogdan George	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
17	Lica Anamaria	Multimedia Systems Engineering	II	08.07.2019-26.07.2019
18	Linte Irina	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
19	Lupu Andreea	Computer science and Computer Engineering	III	08.07.2019-26.07.2019
20	Muresan Mihai	Information Technology	II	08.07.2019-26.07.2019
21	Nanu Paul	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
22	Neacsu Maria Madalina	Applied Electronics	II	08.07.2019-26.07.2019
23	Popa Nicolae Catalin	Applied Electronics	III	08.07.2019-26.07.2019
24	Pridie Ceridian Atanasie	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
25	Statescu Andrei	Information Technology	II	08.07.2019-26.07.2019
26	Totoroga Madalina	Information Technology	II	08.07.2019-26.07.2019
27	Tudoroiu Ilie Valentin	Applied Electronics	III	08.07.2019-26.07.2019
28	Turbureanu Aida Maria	Computer science and Computer Engineering	II	08.07.2019-26.07.2019
29	Udrescu Claudiu	Electromechanics	III	08.07.2019-26.07.2019
30	Vasilas Iulia	Computer science and Computer Engineering	II	08.07.2019-26.07.2019

Students that made the internship at COMPA SA Sibiu (consortium with PRELMET partner) in the period 09.07.2019-27.07.2019.

Table 3.2. List of ULBS students who made practiced at COMPA SA Sibiu (PRELMET partner)

Item	Student Name	Specialization	Year study	Start date
1	Argesanu Marin-Daniel	Machines Manufacturing Technologies	II	09.07.2019-27.07.2019
2	Catana Narcis-Constantin	Machine-Tools and Production Systems	III	09.07.2019-27.07.2019
3	Contiu Elena	Mechatronics	II	09.07.2019-27.07.2019
4	Crisca Raul-Sorin	Machines Manufacturing Technologies	II	09.07.2019-27.07.2019
5	Cristian Bogdan Andrei	Machine-Tools and Production Systems	II	09.07.2019-27.07.2019
6	Cucu Ovidiu-Gabriel	Machines Manufacturing Technologies	II	09.07.2019-27.07.2019
7	Gindila Ana-Maria	Economic Engineering in Mechanical field	II	09.07.2019-27.07.2019
8	Gherasim Alexandru-Victor	Mechatronics	II	09.07.2019-27.07.2019
9	Gligor Emanuel-Ioan	Mechatronics	II	09.07.2019-27.07.2019
10	Haiduc Alexandra-Elena	Engineering and Environmental Protection in Industry	III	09.07.2019-27.07.2019
11	Magureanu Iulian-Florin	Economic Engineering in Mechanical field	II	09.07.2019-27.07.2019
12	Manole Paul-Andrei	Mechatronics	II	09.07.2019-27.07.2019
13	Popa Claudiu-Andrei	Machines Manufacturing Technologies	III	09.07.2019-27.07.2019
14	Stoisor Miruna-Maria	Economic Engineering in Mechanical field	III	09.07.2019-27.07.2019
15	Tiplea Maria-Iuliana	Economic Engineering in Mechanical field	II	09.07.2019-27.07.2019
16	Vadean Catalina-Ioana	Engineering and Environmental Protection in Industry	III	09.07.2019-27.07.2019
17	Viloiu Irina	Machines Manufacturing Technologies	III	09.07.2019-27.07.2019
18	Visa Andreea-Ecaterina	Machine-Tools and Production Systems	III	09.07.2019-27.07.2019
19	Vlad Nicolae-Madalin	Machines Manufacturing Technologies	III	09.07.2019-27.07.2019

### 3.5 Bachelor, Master, PhD thesis project

Companies around Sibiu in the collaboration with the “Lucian Blaga” University of Sibiu proposed in each year a list of bachelor and master issues that can be develop by students from university in collaboration with companies. In the Table 2 are provided a list with the name of the students and the project title that was coordinate by professor from ULBS that are involved in the DigiFoF project: Daniel Volovici, Remus Brad, Adrian Florea, Daniel Morariu.

**Table 3.3. ULBS List with students that develop projects for companies**

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	Master	FLEACĂ Valentin	Face Emotion Recognition	2019	Continental System Sibiu
2	Master	IAMANDI Laura Diana	System for picking and estimating the number of objects in a warehouse	2019	Continental System Sibiu
3	Master	STANCIU Sergiu Gabriel	Small scale autonomous guided vehicle	2019	Continental System Sibiu
4	Master	MODRÂNGĂ Cristina Maria	A Study of Hematoma Detection from Medical Images	2019	Sibiu County Clinical Hospital
5	Master	TALPOȘ Elena Mădălina	A Study of Pedestrian Detection from Infrared Images	2019	Continental System Sibiu
6	Master	STOIA Paul Claudiu	Automatic Measurements of Foetal Head Circumference in Ultrasound Images	2019	Sibiu County Clinical Hospital
7	Bachelor	Durdun Abel Emanuel	Development of a hardware-software application for air quality monitoring	2019	Environmental Protection Agency Sibiu
8	Bachelor	Dușleag Alin Dumitru	Smart buffer	2019	Continental System Sibiu
9	Bachelor	Oprîș D-I. Karina- Mihaela	Driver Assistance application by obstacles detection	2019	Continental System Sibiu
10	Bachelor	Lică I. Adelina Teodora	Position and braking lights detection at motor vehicles from image sequences	2019	Continental System Sibiu
11	Bachelor	Boștină V. Cătălina-Maria	Pedestrian detection from image sequences	2019	Continental System Sibiu
12	Bachelor	Mesea V. Ionica- Cristina	Defect detection on the road surfaces	2019	Continental System Sibiu
13	Bachelor	Ciucă A. Mihai Marius	Behaviour autonomous car prediction in the event of a pedestrian collision	2019	Continental System Sibiu
14	Bachelor	Danciu L. Daniel- Ionuț	Application for controlling the specific parameters to a robotic arm. Analysis the cobot problems	2019	Marquardt GmbH Sibiu
15	Bachelor	Oancea Ș. Andrei Ștefan	Development an interlocking system applied to manual processes in production.	2019	IFM efector /prover SRL

Item	Thesis Type	Student Name	Project title	Year	Target companies
16	Bachelor	Ciuclea G. Victor-Ştefan	Stack consumption analysis in the context of embedded systems applications.	2019	Continental System Sibiu
17	Bachelor	Olariu I. Diana Ioana	Air quality information and monitoring platform using IoT devices.	2019	Sibiu City Hall, Environmental Protection Agency Sibiu

Students from Bachelor and Master that Develop Thesis on the Project Fields in 2020:

Item	Thesis Type	Student Name	Project Title	Year	Target Companies
1	Bachelor	Muntean I. Maria	Parking of a M-BOT with help of modelling language	2020	DigiFoF Project
2	Bachelor	Budiu C.N. Cristiana-Roxana	Classification of sounds from vehicles	2020	Continental System Sibiu
3	Bachelor	Dobrin D Flavius-Daniel	Hardware and software system for detecting the correct position of the spine	2020	Sibiu County Clinical Hospital
4	Bachelor	Baltes I. Octavian-Isoaia	Automation of assembly lines with help of the robotic arm and an M-BOT.	2020	DigiFoF Project
5	Bachelor	Purece D. Ana-Maria	Development of a dedicate air quality monitoring system	2020	Environmental Protection Agency Sibiu
6	Bachelor	Mondoc N. Anca Claudia	Remotely controlled mobile robot (with real-time playing images)	2020	Marquardt Schaltsysteme Sibiu
7	Bachelor	Bîrsan S. Cristina Andreea	Detection of brain tumours with imaging processing	2020	Sibiu County Clinical Hospital
8	Bachelor	Milaşcon I. Lidia	Detection and counting of vehicles for a video source	2020	Continental System Sibiu
9	Master	Carjan G. Diana-Florinela	Pneumothorax detection and segmentation in chest x-ray images	2020	Sibiu County Clinical Hospital
10	Master	Vasilaş C. Teodora	Automatic design space explorer for VLIW architecture	2020	Continental System Sibiu
11	Master	Rădulescu M. Marius-Constantin	Image processing for smart parking lot	2020	Continental System Sibiu
12	Master	Hagiu(Radulescu) M. Maria Elena	Image processing for fog detection	2020	Continental System Sibiu
13	Master	Filimon I. Raul -Constantin	Artificial Intelligence application for traffic management systems	2020	Visma Software S.R.L.
14	Master	Moraru N. Diana-Ionela	Storage manager using AGVs for manufacturing in the context of industry 4.0	2020	Continental System Sibiu
15	Master	Dragoe M.F Gina-Irina	A method for face detection using Viola-Jones algorithm	2020	Continental System Sibiu
16	Master	Popa G.Carmen	Localization and mapping with autonomous robot, based on Lidar sensors	2020	Continental System Sibiu



Item	Thesis Type	Student Name	Project Title	Year	Target Companies
17	Master	Aflat Horea Ovidiu	Walking bag	2020	
18	Master	Marcu D. Simona- Daniela	Innovative solution for parking-sharing of private institutions	2020	Continental System Sibiu
19	Master	Ciorică I. Florentin Cătălin	Autonomous self-driving museum assistant	2020	Continental System Sibiu

### **3.6 Excursions (lab visits, industrial visits etc.)**

In period 9-16.12.2019 took place the excursion “Fascinatia industriei auto (The fascination of the auto industry)” with the following main objectives that were visited:

- BMW company and museum;
- Audi company and museum;
- Technical museum Munich.

The list with all 45 students who participated at this excursion is submitted in the document “D5.2-List of participants\_ULBS”.

## 4 UNIBG joint academy-industry action

In follow we will present actions carried out by UNIBG partner in period 01.2019-12.2020 in the DigiFoF project. Some of actions was planned and described already in the deliverable D5.1 because the deliverable D5.1 was prepared at the end of the year, according to the planning, and already some of the actions were being carried out.

### 4.1 Online and face-to-face trainings and Webinar

Members from UNIBG contribute at one webinar in the 2019 year, as was in proposed plan:

1. In 07.10.2019 webinar #2 with name “Introduction and research interest of each Laboratory” where Fabiana Pirola presented the general idea that will be integrated and develop in the white paper for this project.
2. In 11.03.2020 webinar #10 with name “Omilab use case: IoT platform as enabler of new Product-Service” where Fabiana Pirola presented an Omilab use case in the field of PSS.

### 4.2 Lectures (series) in academia and industry

Lectures topic	Lecturer / Participant	Date	Participants	Qualitative results
NEMO 2019	Sergio Cavalieri	July 2019	50	Knowledge transfer re-used by PhD students; practical exercises re-used for other teaching purposes
Operations management	Sergio Cavalieri/ Fabiana Pirola	September 2020	50	Teachings programmed yearly to transfer knowledge to master students. Proposal of BPM projects to students.
Supply and service chain management	Giuditta Pezzotta	May 2019	50	Teachings programmed yearly to transfer knowledge to master students.
Operations management for FoF	Fabiana Pirola	May 2020	15	Knowledge transfer to professionals, with particular focus on operations management 4.0 and BPM (modelling and simulation)
Service management for FoF	Giuditta Pezzotta	November 2020	15	Knowledge transfer to professionals focused on the transition towards servitization
Long life training in service management	Giuditta Pezzotta	November 2020	15	Knowledge transfer to professionals focused on the transition towards servitization
BPM in textile industry	Fabiana Pirola	July 2020	12	Knowledge transfer to professionals with particular focus on BPM and BPMN 2.0

### 4.3 Invited talks both in academic and industrial settings

On 06.11.2019 the visiting researcher Antonio Maffei provided a talk on “Business Models and challenge-driven research: a perspective from production research”.

On 21.10.2020 dr. Claudio Turconi, CIO of Ratti Spa provided a speech on “Production monitoring with product tracking and product/process integration”.

On 02.12.2020 dr. Julio Galati and Daniele Nisoli provided a speech on “The adoption of Lean 4.0 in industry”

#### 4.4 Internships (e.g. Erasmus+ / student internships)

In the partnership between UNIBG and companies around Bergamo some of the students go into companies to make practice in the internship period.

Table 4.1. UNIBG students who made internships

Item	Student Name	Specialization	Year study	Start date	Organising Company
1	Bonaldi Francesco	Management engineering	2	13.02.2019	Balance systems
2	Cavaliere Concetta	Engineering and Technology for health	3	11.09.2019	Synlab
3	Luca Doneda	Management engineering	2	01.11.2019	Ratti SpA
4	Facheris Valentina	Management engineering	2	20.01.2020	SMI SpA
5	Erika Milesi	Management engineering	2	20.01.2020	SMI SpA
6	Marco Venuta	Management engineering	2	20.01.2020	SMI SpA
7	Alessandro Manzoni	Management engineering	2	20.01.2020	SMI SpA
8	Sonia Amigoni	Management engineering	2	01.02.2020	Aesys
9	Sara Somaini	Management engineering	2	15.11.2020	Fedabo
10	Francesco Cazzaniga	Management engineering	2	15.11.2020	Fedabo
11	Ilaria Bianchini	Management engineering	2	05.10.2020	Ratti SpA
12	Aharon Gentili	Management engineering	2	01.12.2020	Tenaris SpA

#### 4.5 Bachelor, Master, PhD thesis project

Companies around Bergamo in the collaboration with the University of Bergamo proposed in each year a list of bachelor and master issues that can be develop by students from university also in collaboration with companies. In the Table 2 are provided a list with the name of the students and the project title that was coordinate by professor from UNIBG that are involved in the DigiFoF project: Fabiana Pirola, Giuditta Pezzotta, Sergio Cavalieri, Roberto Pinto. Other theses have been developed on the topic related to the factory of the future.

Table 4.2. UNIBG list with students that develop projects on the FoF topics

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	PhD	Roberto Sala	Design and assessment of a decision-making process for data-driven maintenance provision in Product-Service System	2020	Balance Systems SMI Spa
2	PhD	Chiara Cimini	A roadmap for the integration of human workers and technology in the next generation manufacturing systems: a socio-technical perspective	2019	Brembo
3	PhD	Michela Zambetti	A data-driven approach to PSS engineering: explore the potential of data availability and its impact on PSS ecosystem	2020	ABB
4	Bachelor	Piantoni Mattia	Analysis of the production and organizational processes of an engineering company with a view to continuous improvement	2019	
5	Bachelor	Trapletti Andrea	Analysis of the production and organizational processes of an engineering company with a view to continuous improvement	2019	
6	Bachelor	Piazzalunga Marco	Industry 4.0 applications in the agro-food sector	2019	MioOrto
7	Bachelor	Barzani Claudia	Big Data in Operations Management	2019	
8	Bachelor	Brambilla Chiara Maria	Big Data in Operations Management	2019	
9	Bachelor	Rachdaoui Badr	Cyber-Physical Systems in the context of product-service systems: analysis of literature and services offered	2019	
10	Master	Amato Hernandez Paolo Andres	Decision making in field service scheduling	2019	AtlasCoop
11	Master	Bendotti Michele	Digital Transformation as a challenge for the new era of SCM: measuring the digital maturity level of the Supply Chain through Readiness Assessment tools	2019	
12	Master	Locatelli Andrea	Digital Transformation as a challenge for the new era of SCM: measuring the digital maturity level of the Supply Chain through Readiness Assessment tools	2019	
13	Master	Lombardoni Barbara	Engineering and assessment of product-service solutions in manufacturing realities: the BFT case	2019	BFT
14	Master	Maltagliati Miranda Silvia	Engineering and assessment of product-service solutions in	2019	BFT

Item	Thesis Type	Student Name	Project title	Year	Target companies
			manufacturing realities: the BFT case		
15	Bachelor	Rigamonti Alessandra	Internet of Things in the 4th range production chain.	2019	
16	Master	Ferrari Giorgia	The re-engineering of the production planning process in the context of Industria 4.0: the Ratti S.p.A. case.	2019	Ratti
17	Master	Bertoletti Sara	The re-engineering of the production planning process in the context of Industria 4.0: the Ratti S.p.A. case.	2019	Ratti
18	Bachelor	Persico Matteo	Discrete event simulation of production systems: comparison between two simulators in a real-life case	2019	
19	Bachelor	Previtali Francesca	Discrete event simulation of production systems: comparison between two simulators in a real-life case	2019	
20	Bachelor	Belotti Riccardo	Logistics 4.0: analysis of the new technologies to support the operator	2019	
21	Bachelor	Carrara Simone	Maintenance 4.0: principles, strategies, technologies and application cases.	2019	
22	Bachelor	Salvatoni Alberto	Maintenance 4.0: principles, strategies, technologies and application cases.	2019	
23	Bachelor	Lombardi Nicola	Re-engineering of production processes for a company working on a single order: the Innse-Berardi S.p.A case	2019	Innse-Berardi
24	Bachelor	Rota Luca	Sustainable Product-Service System Design from a strategic sustainable development perspective	2019	
25	Bachelor	Guazzi Marta	5G Technologies in the Manufacturing Industry: state of the art, potential and future developments	2019	
26	Bachelor	Limonta Andrea	The evolution of business models in the clothing industry in context of Industry 4.0	2019	
27	Bachelor	AHBAR DOUNIA	Simulation models developed for the spread of infectious diseases	2020	
28	Bachelor	ALBORGHETTI FEDERICA	Development of a use case in the healthcare field within OMiLAB - laboratory for research and experimentation of modelling methods	2020	

Item	Thesis Type	Student Name	Project title	Year	Target companies
29	Bachelor	LUCCHINI ALICE	Simulation models and prediction techniques for the spread of infectious diseases	2020	
30	Bachelor	MAGNI MARTINA	Pipette controllers and spare parts management: San Raffaele Hospital Case	2020	
31	Bachelor	ARRIGONI DANIELE	Sizing and design of automated warehouses	2020	
32	Bachelor	BESTETTI LUCA	Analysis and optimization of material flows within a production department: the Brembo S.p.A. case.	2020	Brembo S.p.A.
33	Bachelor	MORSTABILINI ANDREA	Application of artificial intelligence in service delivery in manufacturing companies	2020	
34	Bachelor	TASCA MARCO	Setting up a Performance Measurement Dashboard for Maintenance	2020	
35	Bachelor	AGUSTONI STEFANO	Reorganization and optimization of warehouse layout: the My Cooking Box case	2020	My Cooking Box
36	Bachelor	FERRARI ZOE	Reorganization and optimization of warehouse layout: the My Cooking Box case	2020	My Cooking Box
37	Bachelor	AMIGONI SONIA	Application of Lean Thinking tools for the optimization of assembly processes: the Aesys SPA case	2020	Aesys SPA
38	Bachelor	QUADRIO UMBERTO	A stochastic model of Total Landed Cost to support decision making in a manufacturing supply chain	2020	
39	Bachelor	NORIS SIMONE	Redesigning cooking center maintenance plans: the Dussmann Service case	2020	Dussmann Service
40	Master	JOY ALBY	An overview of Decision Support System in maintenance from Industry 4.0 perspective	2020	
41	Master	MANSURI ALI NUREDDIN ALI	Application of Blockchain Technology in the Oil and Gas industry	2020	
42	Master	FACHERIS VALENTINA	Business processes reengineering within an IoT platform implementation project: the Smi case study	2020	SMI Spa
43	Master	ABBATTISTA ALESSIO	L'adozione della tecnologia 5G nei sistemi di produzione: uno studio esplorativo	2020	
44	Master	MILESI ERIKA	Business processes reengineering within an IoT platform implementation project: the Smi case study	2020	SMI Spa

Item	Thesis Type	Student Name	Project title	Year	Target companies
45	Master	BALDI LORENZO	Logistics processes optimization in a factory open yard	2020	
46	Master	MANZONI ALESSANDRO	IoT platform for the dynamic monitoring of key-performance indicators: the SMI case study	2020	SMI Spa
47	Master	VENUTA MARCO	IoT platform for the dynamic monitoring of key-performance indicators: the SMI case study	2020	SMI Spa
48	Master	CORONA MATTEO	The machine learning algorithm selection framework: test with multiple datasets	2020	
49	Master	ARDITI ANTONIO	Supply Chain Sustainability: A Multi-objective Closed-loop Cycle Model for the WEEE Industry	2020	
50	Master	BOSCHINI GABRIELE	The adoption of 5G technology in manufacturing systems: an exploratory study	2020	

#### **4.6 Excursions (lab visits, industrial visits etc.)**

In 2019, took place the following three excursions:

- 28.10.2019: visit to the SMILE (Smart Manufacturing Innovation Lab) with 10 participants;
- 28.11.2019: Industry 4.0 in action at ABB Italy with 55 participants;
- 20.11.2019: Lean 4.0 in action at Vinservice with 50 participants.

The list of participants is reported in the document “D5.2-List of participants\_UNIBG”.

Due to COVID pandemic we would not be able to organize excursions in 2020.

## 5 UNIBIAL joint academy-industry action

### 5.1 Online and face-to-face trainings and Webinar

Table 5.1. UNIBIAL webinars

Item	Webinar topic	Presenter	Date
1	Introduction and research interest of each Laboratory	Arkadiusz Jurczuk	07.10.2019
2	Gaps in digital competencies of the employees of the Factory of the Future	Julia Siderska	16.01.2020

In the webinar “Introduction to DigiFoF” main areas of scientific research carried out by UNIBIAL team were presented. Furthermore, capabilities of UNIBIAL Laboratory and its potential input into the DIGIFoF project were introduced.

Webinar “Gaps in digital competencies of the employees of the Factory of the Future” aimed at presenting general results from “Report on needs and demands for FoF-design: Findings and recommendations” and recommendations on the scope of potential trainings for students and employees.

Furthermore, DIGIFoF project deliverables were presented by Arkadiusz Jurczuk, Alicja Gudanowska on 04.12.2019 during the workshop “Management challenges” organised by *The Scientific Society of Organization and Management, Branch in Bialystok* and *Polish Association for Production Management, Branch in Bialystok*. They gave a talk about demands and needs in the scope of digital competencies of the employees of the Factory of the Future.

Detailed about the event are submitted on the websites:

**Bialystok University of Technology, Faculty of Engineering Management**

<https://wiz.pb.edu.pl/2019/11/21/kolejne-seminarium-warsztatowe-pt-wyzwania-zarzadzania-5-0/>

**The Scientific Society of Organization and Management**

[http://www.tnoik.org/index.php?option=com\\_content&view=article&id=176:seminaria-warsztatowe-pt-wyzwania-zarzadzania-50-2019&catid=40:aktualnoci&Itemid=18](http://www.tnoik.org/index.php?option=com_content&view=article&id=176:seminaria-warsztatowe-pt-wyzwania-zarzadzania-50-2019&catid=40:aktualnoci&Itemid=18)



## 5.2 Lectures (series) in academia and industry

In the reported period three lectures and workshops have been provided. They were given for students of Bialystok University of Technology (UNIBIAL) and international students, among others in the scope of Erasmus+ Programme (see Table 2).

**Table 5.2. UNIBIAL lectures in academia**

Item	Topic	Lecturer	Period	Number of participants
1	Business process management	Arkadiusz Jurczuk	October 2019/ January 2020	52
2	Process management (Erasmus+ Programme)	Arkadiusz Jurczuk	October 2019/ January 2020	4
3	Designing of business models for services	Arkadiusz Jurczuk	November 2019/ January 2020	17
4	Modern management methods and tools in logistics (Robotic Process Automation)	Julia Siderska	October 2020/January 2021	30
5	Contemporary methods of management and smart IT tools (Robotic Process Automation – workshop)	Julia Siderska	October 2020/January 2021	10
6	Business Model Canvas in service engineering (workshop)	Alicja Gudanowska	March and May 2020	20
7	Creating a roadmap for selected technological innovation (workshop) (Erasmus+ Programme)	Alicja Gudanowska	December 2019	4
8	Creating a roadmap for selected technological innovation (workshop) (Erasmus+ Programme)	Alicja Gudanowska	May - June 2020	6
9	Business process management	Arkadiusz Jurczuk	October 2020/January 2021	68
10	Process management (Erasmus+ Programme)	Arkadiusz Jurczuk	October 2020/January 2021	2
11	Designing business models for service activities	Arkadiusz Jurczuk	October 2020/January 2021	13

### 5.3 Invited talks both in academic and industrial settings

In the reported period UNIBIAL team took a part in three meetings organised by Innovation and Development Promotion Centre (IDPC).

**Table 5.3. UNIBIAL invited talks provided in the reported period**

Item	Presented topic	Presenter	Date	Company
1	Role and functionality of OMILABFoF	Arkadiusz Jurczuk	17.12.2019	Metal Processing Cluster (MPC) General Meeting of Shareholders
2	Idea of OMILABFoF laboratory	Arkadiusz Jurczuk	15.01.2020	Metal Processing Cluster (MPC) GZW Lobbying
3	Needs and demands of the employees of the Factory of the Future – selected aspects	Alicja Gudanowska	25.02.2020	TOCK-AUTOMATYKA
4	Business process automation with the use of Robotic Process Automation technology	Julia Siderska	13.11.2020	The Future Industry Platform
5	Application of intelligent automation technology at various supply chains	Damian Kędziora (Guest lecturer, Norian)	18.12.2020	Norian/ Bialystok University of Technology

Two invited talks were devoted to a role of OMILABFoF laboratory in digital competency development. Presentation was addressed to potential beneficiaries of DIGIFoF project - members of Metal Processing Cluster (MPC). The presentation given by Alicja Gudanowska considered areas of potential trainings for students and pupils of technical and vocational-technical schools as well.

The guest lecture “Application of intelligent automation technology at various supply chains” presented by dr. Damian Kedziora from Norian was addressed to master and bachelor students of Bialystok University of Technology (Faculty of Engineering Management). The lecture focused on business process digitalization aspects including: Robotics Process Automation in service industry, Blockchain, Artificial Intelligence.

### 5.4 Internships (e.g. Erasmus+ / student internships)

Internships in the DigiFoF domain were organised in cooperation with Innovation and Development Promotion Centre (IDPC) and Metal Processing Cluster (MPC). Details about this cooperation are given in the section 9.

### 5.5 Bachelor, Master, PhD thesis project

As part of the didactic activity and cooperation with business, thesis on selected aspects of FoF is conducted. In the reporting period, one thesis using the OMILABFoF methodology (process modelling, Scene2model-storytelling), coordinated by Arkadiusz Jurczuk was finished. Also, one work related to the process automation undertaken in logistics companies was finished (the concept of the application for controlling the automatic lift trucks), coordinated by Alicja Gudanowska.

**Table 5.4. UNIBIAL thesis for companies in the scope of chosen FoF aspects**

Item	Thesis Type	Student Name	Project title	Year	Target companies
1	Bachelor	Patryk Żbikowski	Concept for digitizing the process of daily data exchange of the rail freight of Barter Inc.	2020	Barter Inc.
2	Engineering	Krystian Siemieńczuk	Project of automation of selected processes as an element of improvement of operational activity of logistic companies	2020	

## 6 UNIOULU joint academy-industry action

In follow actions carried out by UNIOULU partner in period 01.2019-12.2020 in the DigiFoF project are presented. Activities in the reported period referred to two groups of project tasks - webinars and lectures in academia.

### 6.1 Online and face-to-face trainings and Webinar

Members from UNIOULU contribute at one webinar in the 2019 year, as was in proposed plan:

1. In 07.10.2019 webinar #2 with name “Introduction and research interest of each Laboratory” where Juha Röning and Xiaowen Wang presented the general idea that will be integrated and develop in the white paper for this project.
2. In 13.05.2020 webinar #12 “Using conceptual modelling for automatisisation in chemistry laboratory”.

### 6.2 Lectures (series) in academia and industry

In 2019 UNIOULU has 1 lecturer that participated at NEMO 2019 on the 17.07.2019 giving a lecture on “Collaborative and well-behaved outdoor robots in harsh environment”.

### 6.3 Invited talks both in academic and industrial settings

On 13.03. Biomimetic and intelligent systems group of Oulu university hosted AI & ROBOTICS BUSINESS EVENT for companies developing or utilising autonomous technology, AI and robotics. Speaks given in the event included:

Lecture name	Speakers	Company
Opening	Juha Röning	University of Oulu
Open Infra BIM integrated Autonomous Excavator	Rauno Heikkilä	University of Oulu
GOF U-space project, Urban Air Mobility”	Jonas Stjernberg	
Robotics in the future rural transportation system	Rune Storvold Research	Director at NORCE “
Digital platform for U-space, opportunity for Drone business to grow	Pasi Nikama	SPV Marketing & customer relations
UAVs and Next Generation mobile networks	Richard Wiren	Ericsson
The challenges for autonomous and unmanned aircraft in the high north	Kim Lynge	UBIQ Aerospace

On 10.11-12.11. University of Oulu hosted CriM 2020 Cyber Security Seminar and Workshops. Due to the COVID epidemic situation, the event was held online with speakers, delegates and students participating in the event remotely. The international

Crisis Management workshop CriM gathers the teachers, researchers, experts and students of cybersecurity annually to study pressing issues of security and privacy of our digital systems. Respected international and Finnish lecturers combined with practical workshops each day bring the important insights of the current world to students interested in cybersecurity. 2020 CriM focused on the NEXT GENERATION INTERNET and its challenges. Speakers talked about cybersecurity issues and legislative problems but also projects around the world tackling these issues. In addition to lectures, students also got to test their skills in practical workshops organized each day. The students were also awarded 5 ECTS for participating and completing all the assigned tasks for each of the lectures and workshops. Lectures given during event included:

Lecture name	Speakers
Start lecture	Juha Röning
Digital forensic in enterprises	Ludwig Englbrecht
Cybersecurity in light of legislation	Gerald Quirchmayr
The challenge for managing security requirements for Ot environments	Markku Tyynelä
Cybersecurity presentation	Kimmo Halunen
The cost of Cybersecurity breached	Steven Funell
Cybersecurity presentation	Gabriela Limonta
Trusted computing	Ian Oliver
Secure critical infrastructures	König Sandra
Running infosec tools securely using containers and cincan	Rauli Kaksonen

Workshops organised during CrimM 2020 were about cyberrange, trusted computing and cyber forensic.

#### **6.4 Bachelor, Master, PhD thesis project**

University of Oulus Biomimetics and Intelligent Systems groups Robotics group studies and develops methods, theories, sensors and platforms for creating mobile robots that are adaptive and capable of performing purposeful tasks in cooperation with humans. Robotics research activity at BISG includes collaboration with processing industry. Projects done in cooperation with industry don't always lead directly to thesis but value is generated in knowledge gained during projects. Some projects developed in collaboration with industries during 2019 and 2020 include:

- **EAKR - Labrobot** – Developing food industry with robotics in collaboration with Luonnonvarakeskus Luke, Probot Oy, Mekitec Oy, Maustaja Oy, Kinnusen Mylly, Yaskawa Finland and Oy Katri Antell Oy

- **HYFLIERS** – Oil refinery pipe inspection with flying drones in collaboration with University of, University of Seville (Spain), Chevron Oronite (France), Total (France), Consorzio di Ricerca per l’Energia e le Tecnologie dell’Elettromagnetismo C.R.E.A.T.E. (Italy), Advanced Center for Aerospace Technologies FADA-CATEC (Spain), General Electric Inspection Robotics (Switzerland) and, DASEL sistemas (Spain)
- **EAKR Garbot** – Utilizing robotics and AI for material recycling with Suomen ympäristökeskus, Oulun energia, Vimelco and Kiertokaari.,
- **EAKR Geobot** – Utilizing robotics for geopolymer manufacturing in collaboration with Oulu University of Applied Sciences, Saint-Gobain S.A. Keliber Oy and Boliden AB.

## 7 BOC joint academy-industry action

In follow we will present actions carried out by BOC partner in period 01.2019-12.2019 in the DigiFoF project. Some of actions was planned and described already in the deliverable D5.1 because the deliverable D5.1 was prepared at the end of the year, according to the planning, and already some of the actions were being carried out.

### ***7.1 Online and face-to-face trainings and Webinar***

BOC coordinated the development of webinars done by other consortium members as well as created two webinars, as it was in proposed in the action plan:

1. On 18.09.2019 – a webinar #4 with name “DigiFoF webinar 4 - FoF design with ADOxx” in which Zbigniew Misiak explained how ADOxx platform can be used to design FoF
2. On 16.10.2019 – a webinar #5 with name “DigiFoF webinar 5 - How to set up Olive based portal and brokerage” in which Zbigniew Misiak explained presented the current development of Olive platform, including instruction on how to properly setup this platform.
3. On 13.11.2019 – a webinar #6 with name “Design thinking with Scene2Models” presented by Michael Walch, in which explain how Science2Model can be used to design FoF.

## **8 OMiLAB joint academy-industry action**

In this chapter, the actions carried out in the DigiFoF project by OMiLAB NPO in the period from January 2019 until December 2019 are presented.

### ***8.1 Online and face-to-face trainings and Webinar***

In 2019, OMiLAB NPO contributed the following webinars:

1. The webinar #3 “Introduction and requirements for OMiLAB” was presented by Wilfrid Utz on the 04/09/2019. In this webinar, the OMiLAB Laboratory was introduced and the physical as well as the technical requirements for setting up an OMiLAB were explained.
2. The webinar #7 “Flowchart and Petri net steering with BeeUp” was presented by Wilfrid Utz on the 11/12/2019 explaining the modelling languages flowchart and Petri net using the BeeUp software tool.

### ***8.2 Lectures (series) in academia and industry***

On the 19/07/2019, during NEMO summer school, Wilfrid Utz presented this EU project DigiFoF to the participants of the summer school. The presentation covered the motivation for the project, the purpose of the project, including the concept, the objectives as well as project facts and figures and concluded with an outlook.



## 9 IDPC joint academy-industry action

Activities carried out by IDPC in the reported period refer to two groups of project tasks - invited talks and internships. All actions have been described in the action plan (deliverable D5.1).

### 9.1 Invited talks both in academic and industrial settings

IDPC Poland provides the three actions in the scope of this set of project tasks. They aimed at presentation of fundamental aspects of Industry 4.0.

**Table 9.1. IDPC invited talks in the reported period**

Item	Presenter	Topic	Event and Date	Company
1	Sebastian Rynkiewicz	On the Way to Industry 4.0	November 2019	University of Bialystok / Faculty of Mechanical Engineering
2	Sebastian Rynkiewicz	Competent success factors of the industry of the future	April 2019 Congress of Leaders of Change	The University of Finance and Management
3	Sebastian Rynkiewicz	EU funds after 2020 - possibilities, needs, potential effects. Education and new competencies. Universities versus soft regional projects	September 2019 6th Eastern Economic Congress	Bialystok 6th Eastern Economic Congress

### 9.2 Internships (e.g. Erasmus+ / student internships)

Internships coordinated by IDPC were addressed mainly to UNIBIAL students and teachers. In the reported IDPC provides the following actions.

**Table 9.2. Internships coordinated by IDPC**

Item	Student Name	Specialization	Year study	Start date	Organising Company
1	Karolina Ślinko	Biomedical engineering	Final year of engineer	VIII – IX 2019	Rotational internships in companies :  FERROX Ltd. Samasz Ltd. ChM Ltd Metalfach Ltd.
2	Adrian Lotkowski	Electronic and telecommunications		VIII – IX 2019	
3	Rafał Tarasaewicz	Mechatronics		VIII – IX 2019	
4	Kamil Żukowski	Management engineering		VIII – IX 2019	
5	Karol Rzemieniecki	Mechatronics		VIII – IX 2019	
6	Adrian Kaczmarek	Mechanics		VIII – IX 2019	
7	Sandra Romaniuk	Mechanics		VIII – IX 2019	
8	Paulina Nikołajuk	Biomedical engineering		VIII – IX 2019	
9	Barbara Chojnowska	Mechanics		VIII – IX 2019	

## **10 CONTI joint academy-industry action**

In follow we will present actions carried out by CONTI partner in period covered by this report in the DigiFoF project.

### ***10.1 Online and face-to-face trainings and Webinar***

1. In 28.10.2020 webinar #16: "Cobots - Rapid implementation of Cobots in industrial environment" was presented by Cosmin Moga and Cristian Mihutoiu from the CONTI Company.
2. In 18.11.2020 webinar #17:"AGV for modern Logistics in industrial companies" was presented by Cosmin Moga and Cristian Mihutoiu from CONTI.

## 11 Summary of academia-industry initiatives

DIGIFoF partners in the reported period organized 17 webinars on project and some trainings for professionals, students and teachers as well. Furthermore, project members contributed and gave more than 35 lectures and talks for academics, representatives of enterprises, training institutions and local/regional authorities. Thanks to the strong cooperation in DIGIFoF academia-industry network including HEIs and manufacturing sector it was possible to organize 70 internships in first year and only 19 in the second year but because of restrictions due to COVID-19 period. Also, the excursions start very well in the first year and stop in the second year. Project partners coordinated 46 Bachelor, Master and PhD thesis project related to fundamental aspects of Factory of the Future in first year and 58 in the second year. This confirms the high utilitarian potential of the diploma thesis and the ability of the HEI-industry to work together efficiently in the field of FoF.

Synthesis of all activities carried out by DIGIFoF partners in the reported period (separate for each year) are given in the table below.

**Table 11.1. Summary of academia-industry initiatives**

Type of activity	Achieved result 2019	Achieved result 2020
Online and face-to-face trainings and Webinar	9	13
Lectures (series) in academia and industry	17	19
Invited talks both in academic and industrial settings	11	38
Internships (e.g. Erasmus+ student internships)	70	19
Bachelor, Master, PhD thesis project	46	58
Excursions (lab visits, industrial visits etc.)	6	0