



## Deliverable

### WP5 – Dissemination and exploitation

#### D5.13 Workshops and Events (1)

##### Project Information

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Name	Position in project	Organisation	Date	Visa
Lucia Petti	Coordinator	CNR	16/11/2021	OK
Giuseppe Nenna	Scientific responsible	ENEA	16/11/2021	OK
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## Executive summary

### 1 Executive summary

#### 1.1. Description of the deliverable content and purpose

This deliverable intends to inform the public about all conferences, workshops, seminars or training sessions where the consortium has disseminated its results. It is also supposed to provide information on the different seminars organized by the consortium.

Thereby, this deliverable is divided into two parts. The first one lists all events attended by each partner of the consortium while the second part is addressing the event organized by the consortium.

#### 1.2. Brief description of the state of the art and the innovation breakthroughs

N/A

#### 1.3. Corrective action (if relevant)

N/A

#### 1.4. IPR issues (if relevant)

N/A

## Deliverable report

### 1 Presentations at conferences, workshops, seminars and training sessions

Since the beginning of the project, the PULSE-COM consortium has been involved in 13 different events to disseminate its findings, as stated in the Table 1. At that time of the project, 5 above 8 partners have communicated at least in one conference.

For information, the video produced for the Future Tech Week 2020, is accessible here: <https://www.youtube.com/watch?v=uomppguFXjw>.

Table 1: List of events attended by the PULSE-COM consortium.

	Conference title	Date	Place	Website	Production	Title	Authors
CNR	Summer school on computational Photonics	20-25/09-20	KIT, Karlsruhe (Germany)	<a href="https://www.waves.kit.edu/summerschool2020.php">https://www.waves.kit.edu/summerschool2020.php</a>	Poster	Nanostructures and Photo-Mobile Materials to manipulate light by light	Massimo Rippla, Riccardo Castagna, Domenico Sagnelli, Ambra Vestri, Giuseppe Nenna, Fulvia Villani, Anna De Girolamo Del Mauro, Lucia Petti.
	Future Tech Week 2020	21-25/09/20	Online	<a href="http://www.fetfx.eu/event/future-tech-week-2020/">http://www.fetfx.eu/event/future-tech-week-2020/</a>	Movie	FTW2020 PULSE COM SpotlightVideo	Lucia Petti and Giuseppe Nenna
	2 <sup>nd</sup> International Conference on Materials Science and Nanotechnology	05-07/07/21	Online	<a href="https://materialsconference.yuktan.com/2021/home.php">https://materialsconference.yuktan.com/2021/home.php</a>	Invited presentation	Characterization of Novel Photomobile Polymer Formulations for Future and Smart Materials	Domenico Sagnelli
	EOS Annual Meeting (EOSAM) 2021	13-17/09/2021	Rome (Italy)	<a href="https://www.europtics.org/events/eos/eosam2021.html">https://www.europtics.org/events/eos/eosam2021.html</a>	Invited presentation	Characterization of Novel photomobile polymer formulations for future and smart materials	Domenico Sagnelli, Riccardo Castagna, Massimo Rippla, Ambra Vestri, Valentina Marchesano, Fausta Loffredo, Fulvia Villani, Giuseppe Nenna, Lucia Petti
ENEA	World Conference on Laser, Optic Science & Photonics 2020	03-05/09/20	Online	<a href="https://www.worldlaseropticconference.com/">https://www.worldlaseropticconference.com/</a>	Presentation	Photomobile materials and photonic nanostructures: a way to manipulate light by light	Giuseppe Nenna
UGA	Transducers	20-25/06/21	Online	<a href="https://www.transducers2021.org/">https://www.transducers2021.org/</a>	Presentation	A new approach to calculate the piezoelectric coefficient of piezosemiconductor nanowires integrated in nanocomposites experiment and simulation	Andrés Jenaro Lopez Garcia, Ran Tao, Mireille Mouis, and Gustavo Ardila
	JNSRE 2021 (French national conference)	02-03/06/21	Online	<a href="https://jnse-2021.sciencesconf.org/">https://jnse-2021.sciencesconf.org/</a>	Poster	A Capacitance study of Nanocomposites integrating Piezo-Semiconductor	Andres Jenaro Lopez Garcia, , Ran Tao, Mireille Mouis, and Gustavo Ardila

						Nanowires: Experiment and Simulation	
	Materials Research Meeting	13-16/12/21	Pacifico Yokohama North – Hybrid event	<a href="https://mrm2020.jmru.org/">https://mrm2020.jmru.org/</a>	Presentation	Mechanical energy transducers based on semiconducting piezoelectric nanowires	Gustavo. Ardila, Andres Jenaro Lopez Garcia, Vincent Consonni, Alessandro Cresti, Gerard Ghibaudo, Mireille Mouis
	GDR NAME	04-06/10/21	ESIEE Paris (France)	<a href="https://gdrname.wordpress.com/2021/09/13/reunion-pleniere-du-gdr-2021/">https://gdrname.wordpress.com/2021/09/13/reunion-pleniere-du-gdr-2021/</a>	Poster	Role of semiconductor properties in the performance of ZnO nanowires-based transducers	Andrés Jenaro Lopez Garcia, Manojit Pusty, Thomas Jalabert, Ran Tao, Alessandro Cresti, Mireille Mouis, Gustavo Ardila
SITEX 45	CAS 2021	06-08/10/21	Bucharest (Romania)	<a href="https://www.imt.ro.CAS">https://www.imt.ro.CAS</a>	Presentation	The Safe by Design (SoD) concept applications for nanomaterials based with tailored properties for microsensing devices	Dumitru Ulieru, Oana-Maria Ulieru, Xavier Vila, Alexandru Topor, Florin Babarada
	ISSCS 2021	15-16/07/21	Iasi (Romania)	<a href="http://scs.etti.tuiasi.ro/isscs2021/">http://scs.etti.tuiasi.ro/isscs2021/</a>	Presentation	SITEX-Sensors and microsystems MEMS/MOEMS technology	Dumitru Ulieru, Oana-Maria Ulieru, Xavier Vila Geli
INFLPR	The 9th Global Conference on Materials Science and Engineering CMSE2020	20-23/11/2020	On-line	<a href="http://history.cmseconf.org/2020">http://history.cmseconf.org/2020</a>	Presentation	Very Thin Silver Films on PET and Optical Glass; Obtaining and Properties	Bogdan Alexandru Sava, Rares Victor Medianu, Lucica Boroica, Marius Catalin Dinca, Ana Violeta Filip, Rovena Pascu, Antoniu Moldovan, Marius Dumitru, Mihai Oane, Mihai Eftimie
	CONSILOX 2021	1-2/10/21	Alba Iulia (Romania)	<a href="https://www.consilox.ro/">https://www.consilox.ro/</a>	Presentation	Opal-Inverse Opal nanostructures	Ion Sandu, Bogdan Alexandru Sava, Lucica Boroica, Ana Violeta Filip, Marius Cătălin Dincă, Claudiu Teodor Fleacă, Marius Dumitru



## 2 Organisation of seminars

The PULSE-COM project has conducted one seminar, in the form of a short school since it has started. It is called: “1st Short School on Smart Materials for Opto-electronic applications”.

### 2.1. Description of the short school

Lucia PETTI (CNR), Valentina MARCHESANO (CNR), Domenico SAGNELLI (CNR), Ambra VESTRI (CNR), Giuseppe NENNA (ENEA) and Jean HERISSON (Ayming) have organised the 1st Short School on Smart Materials for Opto-electronic applications.

One of the goals of this International School was to disseminate the scientific achievements of this project. The school was mainly reserved for PhD, MSc students and postdocs, but also researchers from any branch of science who wished to increase their knowledge and awareness about Smart Materials, micro and nanotechnologies.

The aim was to bring to the attendees the concepts and basic working principles of Smart Materials Technologies from experts in the fields coming from both Academy and industries. Moreover, lectures given for addressing complete understanding of how the Smart Materials have been exploited for achieving recent significant results in ground breaking research of this project as well as in applied sciences by investigators working in the PULSE-COM Consortium.

### 2.2. Detailed program

The main scope of this International School was to provide in a short time of only two-days and full-immersion modality a rapid training on six different advanced technologies (FOCUS SESSIONS), namely:

- Piezo-electric Materials
- Photo-active Materials
- Nano-fabrication by top down and bottom up approaches: Electron Beam Lithography and Colloidal Lithography
- Advanced printing technologies & additive manufacturing
- Characterization techniques and their implementation in Smart Materials and devices
- Application of Smart Materials

The detailed agenda is provided in the Figure 1 and Figure 2.

Unfortunately, Gustavo Ardila was absent, and his talk has not been presented. All presentations of the morning had been put forward.

1st International Short School on Smart Materials for opto-electronic Applications			
Tuesday 07/09/2021			
Agenda Item	Leader	Starting Time	Duration
<b>Welcome</b>		<b>09:00</b>	<b>00:15</b>
Welcome and introduction by the coordinator	Lucia Petti Institute of Applied Sciences and Intelligent Systems - ISASI, CNR	09:00	00:15
<b>FOCUS SESSION: Piezo-electric Materials</b>			
Piezoelectric nanocomposites based on piezoelectric semiconducting nanowires	Gustavo Ardila, Grenoble Alpes University UGA	09:15	00:45
Exploration of materials properties and new materials discovery through atomistic simulation	Mateusz Wlazło Centrum Badań i Rozwoju Technologii dla Przemysłu S.A. Research and Development Center of Technology for Industry	10:00	00:45
<b>Coffee Break</b>		<b>10:45</b>	<b>00:15</b>
<b>FOCUS SESSION: Photo-active Materials</b>			
Photosensitive self-assembled photonic crystals: heliconical cholesterics	Francesco Simoni, Università Politecnica delle Marche	11:00	00:30
How to play with DNA and myelin with light?	Katarzyna Matczyszyn, Advanced Materials Engineering and Modelling Group Faculty of Chemistry Wroclaw University of Science and Technology	11:30	00:30
Synthesis and characterization of liquid crystal based photomobile polymers	Domenico Sagnelli, Institute of Applied Sciences and Intelligent Systems - ISASI, CNR	12:00	00:45
<b>Lunch</b>		<b>13:00</b>	
<b>FOCUS SESSION: Nano-fabrication by top down and bottom up approaches: Electron Beam</b>			
New functionalities for PMP materials: silver plasmonic films; opal and inverse opal synthesis; laser patterning	Bogdan Sava and Calin Bogdan Stefanita National Institute of Plasma, Radiation and Lasers Physics - INFLPR	16:00	00:45
"Man-made" Cutting Edge Materials for Light Control and Manipulation at the Nanoscale	Lucia Petti, Institute of Applied Sciences and Intelligent Systems - ISASI, CNR	16:45	00:45
Conclusion on Day 1	Lucia Petti, CNR	17:30	00:10
<b>School day closed</b>		<b>17:40</b>	

Figure 1: Agenda of the first day of the 1st International Short School on Smart Materials for Opto-electronic applications.

1st International Short School on Smart Materials for opto-electronic Applications			
Wednesday 08/09/2020			
Agenda Item	Leader	Starting Time	Duration
<b>FOCUS SESSION: Advanced printing technologies &amp; additive manufacturing</b>			
Advanced printing technologies & additive manufacturing	Dumitru Ulieru, S.C. SITEX 45 S.R.L.	09:00	00:45
Gravure Printing for functional layer production	Maria Montanino SSPT-PROMAS-NANO ENEA	09:45	00:30
Inkjet printed functional layers up to complete devices: characterization analyses and applications	Fulvia Villani SSPT-PROMAS-NANO ENEA	10:15	00:30
<b>Coffee Break</b>		10:45	00:15
<b>FOCUS SESSION: Characterization techniques and their implementation in Smart Materials and</b>			
Organic materials for flexible electronics: impedance measurements and device limits	Giuseppe Nenna, SSPT-PROMAS-NANO ENEA	11:00	00:45
Design and Characterizations of 2D Plasmonic Nanostructures	Massimo Rippla, Institute of Applied Sciences and Intelligent Systems - ISASI, CNR	11:45	00:30
Functionalization approaches for 2D plasmonic devices	Valentina Marchesano & Ambra Vestri Institute of Applied Sciences and Intelligent Systems - ISASI, CNR	12:15	00:30
<b>Lunch</b>		<b>13:00</b>	
<b>FOCUS SESSION: Application of Smart Materials</b>			
Nanocomposite and nanostructure: a way to coupling the light	Giuseppe Nenna, SSPT-PROMAS-NANO ENEA	14:30	00:45
Energy harvesting in the context of unprecedented IoT growth	Maciej Haras, Center for Advanced Materials and Technologies-CEZAMAT, Warsaw University of Technology, Poland	15:15	00:45
Smart materials for innovative actuators	Jolan Gauthier, CEDRAT TECHNOLOGIES (France)	16:00	00:45
2D Photonic Crystals on OF's/PMP for wavelength selection application	Dumitru Ulieru, S.C. SITEX 45 S.R.L.	16:45	00:45
PHD Students Test for 2-3 Credits		17:30	01:00
<b>School closed</b>		<b>18:30</b>	

Figure 2: Agenda of the second day of the 1st International Short School on Smart Materials for Opto-electronic applications.

43 people get connected to the short school, most of them were students. At the end the online school, a group picture has been done with attendees who accept to turn their camera on. It is visible on Figure 3.

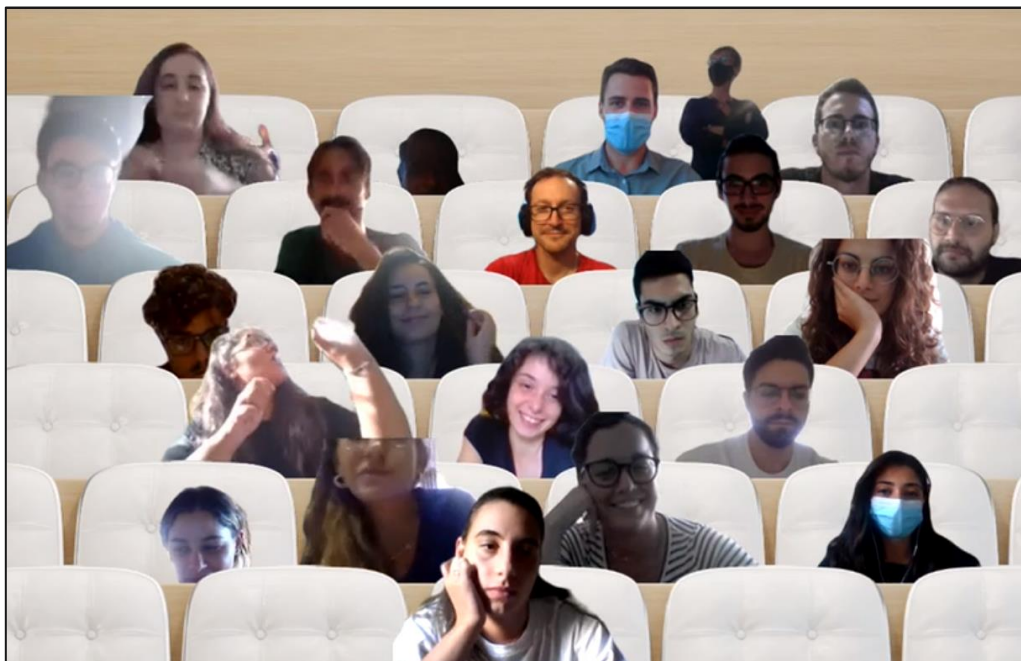


Figure 3: Group picture of the short school attendees.

Some certificates of participation have been elaborated and send directly to each attendee after the event. A model is presented in Figure 4.



Figure 4: Example of a certificate of participation to the first short school on smart materials for Opto-electronic applications.

### 2.3. Questionnaire

At the end of the second day, students were offered the possibility to conduct a test to obtain 2 or 3 credits. It has been chosen to evaluate them with a MCQ with one or two question related to each talk. The questionnaire was composed of 22 questions. All the questions are provided hereafter. For each question, the appropriate answer is given in green with the percentage of student who have chosen it.

1) In the FAIR data principle, what property of the data does R stand for?  
 Reproducible  
 Reusable – 72%  
 Redistributable

2) What is the 4th paradigm of research?

Computational science  
Theoretical science  
Big-data-driven science – 100%

3) The stabilization of the heliconical cholesteric structure requires  
Application of an optical field  
Application of a low frequency field – 28%  
Only suitable surface alignment

4) Lyotropic liquid crystals  
Lyotropic liquid crystals phases are determined by temperature only  
Lyotropic liquid crystals phases are determined by temperature and solvent concentration – 48%  
Lyotropic liquid crystals phases are determined by solvent concentration only

5) Liquid crystals around us (2 answers)  
Lyotropic liquid crystals are omnipresent in nature – 76%  
Thermotropic liquid crystals are more popular due to their use in the industry – 68%  
Lyotropic liquid crystals are too difficult to be handle in the industry

6) Azobenzene isomerize to its cis-form when  
Excited with UV light – 84%  
Excited with visible light  
Heated up while the relative humidity is exactly 54%

7) What is the wavelength range for surface plasmon resonance excitation, in the case of metal nanoparticles?  
UV  
Visible – 28%  
Infrared

8) Surface plasmon resonance is the resonant oscillation of ...?  
Holes  
Phonons  
Conduction electrons – 96%

9) Which is the main difference between optical and electron beam lithography?  
The limit in resolution for EB lithography depends on the light wavelength  
The limit in resolution for EB lithography depends on the beam size – 56%  
The limit in resolution for EB lithography is independent on both light wavelength and beam size

10) Metamaterials are:  
Natural materials very common around us  
Engineered composites with superior properties not observed in the constituent materials – 100%  
Artificial composites with superior properties observed in nature

11) '3D Bioprinting of Hybrid Materials for Regenerative Medicine' Which is design level of architecture of scaffolds structures need as important?  
Macro level  
Micro level

## Nano level – 64%

12) Which are the important issues for the development of the devices using 2D-PC by controls the light propagation inside the 2D plane

The coupling external light into the 2D plane  
Confining light inside the 2D plane

Both – 88%

13) The function of the solvent in the printing ink is

The dispersion of the solid content – 20%

Increase the ink viscosity  
Decrease the ink wettability

14) Which of the following sentences about a LSPR sensing system is wrong?

It allows a label free detection  
It is a sensor system refractive index variations based

It requires a temperature control – 48%

15) Which of the following sentences about the SERS analysis is wrong?

It works using an excitation laser source – 20%

It works using fluorescent labels  
It works using metallic nanoelements

16) What is definition of Energy Harvesting?

Energy that is produced on national scale (in typical range of Mega or GigaWatts) in renewable sources of energy

Energy that is derived from ambient or waste energy (in typical range of micro- and milli-Watts) – 92%

Energy that is lost when it is converted or produced

17) What is the definition Internet of Things (IoT)?

Communication between objects that omits human intervention – 56%

Things (e.g. computers, printers, smartfons, etc.) that are connected to the Internet without communication between the Things

Network of objects (Things) which are constituting Internet

18) Which are the main energy conversion aspects studied in PULSECOM project?

Photostriction and Direct Piezoelectric effect – 48%

Photovoltaic effect and Converse Piezoelectric effect  
Photoelastic effect and Pyroelectric effect

19) Which is the main purpose of the surface sensor bio/modification?

Realize eco-friendly and appealing devices

Improve sensor selectivity and reduce a specific signals – 72%

Modify the local refractive index and the plasmon properties

20) What is a bioreceptor?

A biological molecule that specifically recognize the analyte – 96%

A signal transductor  
None of the above

21) In order to formulate the ink for inkjet printing application it is important to take into account:

The ink surface tension

The ink viscosity

The ink boiling point

All the previous chemico-physical properties of the ink – 76%

22) In the electrical impedance measurements of an OLED device, at which frequencies is the series resistance evaluated?

Low

High – 32%

Indifferent

As Gustavo Ardila had finally been absent, his questions had been removed from the conducted MCQ and not reported here.

#### 2.4.Outlook

All presentations have been recorded during the short school. They will be uploaded on the PULSE-COM YouTube channel and a dedicated webpage will be design onto the PULSE-COM official website to disseminate what has been produced for that event. As a reminder, the website is accessible here: <https://www.pulsecom-h2020.eu/> and the YouTube channel through this link: [https://www.youtube.com/channel/UCoaikfzpYB3OX2eGvnFp8\\_g](https://www.youtube.com/channel/UCoaikfzpYB3OX2eGvnFp8_g)