

Project no.: 229514 KEEN-Regions

## **KEEN-Regions**

Knowledge and Excellence in European Nanotechnology Regions

**REGIONS OF KNOWLEDGE** Maximising the benefits of research infrastructures for regional economic development

### **D 1.1 – Research and knowledge infrastructure report**

Due date of deliverable: Month 4  
Actual submission date: Month 17

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Duration: 3 years

Organisation name of lead contractor for this deliverable: NanoGune

Revision 3

<b>Project co-funded by the European Commission within the Seven Framework Programme</b>		
<b>Dissemination Level</b>		
<b>PU</b>	Public	X
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

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## 0 - WP 1 goals

The goal of WP 1 is to assemble a database of general knowledge about each research driven cluster in order to have accurate information about all the clusters. This knowledge is used to define a SWOT analyses for each area, highlighting both potential areas of growth, as well as policies and techniques to be transferred to other locations on a local or on a trans – regional lever. It will also be used in the following WP to foster mutual learning and collaboration between local sites.

To gather the data needed in order to enhance the mutual knowledge and to define the SWOT the first analytical task foreseen is the 1.1 “**Research infrastructure and knowledge resources**”.

Within the task the main activity is represented by a collection of data concerning:

- Facilities: determine the location, number, and dimensions of all the facilities of each research driven cluster as well as their technical specializations;
- Equipment: list all the equipment at each site, including the number of machines, their specific functions, and their current and potential usage rates;
- Researchers/technicians: determine the total number of personnel;
- Financial Resources: determine the annual budget;
- Research potentiality: collection of the profiles of all the personnel (including degrees earned, special capacities, and prior experience) and information on the current research results (as well as on any patents or pending patents) and on the areas of research, both current and foreseen;
- International collaborations: mapping of all pre-existing international collaborations for each research driven cluster.

### 1.1 - The methodology

Information about the research centres were collected through a structured questionnaire elaborated by NanoGune.

The questionnaire has been designed to gather quantitative data (e.g. the number of researchers, the space availability, the usage rate of the machines) and to determine the research focus of each centre. The goal is to reach a general overview of the different research centres in order to understand better the different contexts and the respective way of working.

This task was performed by each research partner (NanoGune, Veneto Nanotech and CEA Leti) which selected in its own region whether and which other research centres to be included in this analysis.

### INSTRUCTION FOR FILLING IN THE QUESTIONNAIRE

This questionnaire is part of the mapping exercise, foreseen in the **task 1.1 of the KEEN-Regions project**. It is addressed to research institutions working in the different field of the "nanotechnology" sector. The goal of this activity is to increase the mutual knowledge and pave the way for establishing scientific relationships and cooperation among the actors involved.

The information collected will be analysed and published in a report as well as in the project website. In order to promote and introduce properly the institutions of your region and their competences, please complete **all the parts, giving as much information as possible**, and using 1 sheet for each institution. Add more sheets if you would like to present more than one institution.

The green part of the questionnaire aims to collect information about laboratories: as one institution could have more than one specialised laboratory, please copy a paste the section "facilities/labs" to include all the relevant laboratories.

Feel free to enlarge each box accordingly to the needed space. On the right column an explanation for each issue is provided.

		EXPLANATIONS
INSTITUTION PROFILE (Short description of the institution)		Introduce briefly the institution. You can enlarge the box as you need to include the presentation.
CONTACT DETAILS	Contact Person	contact details of the key person that can be contacted to establish links and relationships with the institution
	Position	
	e-mail	
	Tel.	
	Fax	
	website of the institution	
SCIENTIFIC PERSONNEL PROFILE	Number of PhDs (Researchers and Post Docs)	quantitative data
	Number of Students	quantitative data
	Number of Technicians	quantitative data
	Number of Scientific Visitors	quantitative data
	Internal Mobility Programme (Y/N)	Yes or No answer
RESEARCH POTENTIALITY	Research areas	include the research areas which you judge more strategic or that you prefer to point out
	Number Publications/Area	quantitative data
	Number Patents/Area	quantitative data
	Number contracts with Industry	quantitative data
	Main research projects	insert the number of research project (quantitative data)
	International Collaborations (Existing and Potential)	Mention universities and/or research institutions abroad you are collaborating with or you would like to collaborate with

<b>CONTACT DETAILS</b>	Name of the facility/lab		<i>Contact details of the responsible of the laboratory</i>
	Address		
	Contact Person		
	e-mail		
	Tel.		
	website		

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>		<i>quantitative data</i>
	Number of machines		<i>quantitative data</i>
	Usage rate		<i>quantitative data</i>
	List of the main equipment		<i>list the main machines/equipments</i>
	Do you offer technical support? (Y/N)		<i>Yes or No answer</i>

<b>EXPERTISE</b>	Technical Expertise		<i>the technical/research expertise which you can offer</i>
	Application areas		<i>Describe the main application field targeted</i>
	Tecnologies		<i>Select and mention the main technologies you are focusing</i>
	Is available for commercial use/can companies access? (Y/N)		<i>Yes or No answer</i>

## 1.2 - The outcomes

### VENETO CLUSTER

#### The regional framework

The Veneto Region presents a spread and *distributed network of knowledge and research centres*, which main poles are represented by the Universities.

In the field of nanotechnology an high level of competences is concentrated in particular in dedicated laboratories within the University of Padova and Ca' Foscari Venice. Each research group is obviously focalised in its own research lines but contiguity and consistent relationships among the institutes facilitate exchanges and cooperation.

In 2003 the four Universities of the region established together CIVEN, an association aiming to promote research and higher education in the nanotechnology field. Civen staff currently works in NANOFAB laboratory.

#### Main actors interviewed

##### NANOFAB - CIVEN

Nanofab is the Venetian laboratory for research on nanotechnologies applied to materials. It is one of the first Italian laboratories for nanotechnology transfer to industrial production and one of the most advanced technology platforms for the applications of scientific research to enterprises. Nanofab is part of the Italian Cluster for Nanotechnologies and was built between 2005 and 2007. Nanofab research activities are organized in public as well as private projects. Research is mainly focused on surface treatments, nanostructured polymers, powder metallurgy, sensors and biosensors. Nanofab laboratories are equipped with 3 clean rooms and more than 80 instruments. Among them, vacuum deposition chambers PVD and PECVD, atmospheric plasma treatments, polymer extruders, high velocity compaction press and some advanced characterization tools like atomic force, electron and optical microscopes, photoluminescence and laser spectroscopy analysis, compositional analysis and many others. All these activities and laboratories have been fully funded by the Veneto Region Government with more than 25 MLN euros.

## **UNIVERSITY OF VENICE – MATERIAL SCIENCES**

The University of Venice has settled a new laboratory of Materials Science devoted to the study of nanosystems. The research activity is focused on different fields: the preparation and characterization of nanostructured systems with luminescence and catalytic properties obtained by different chemical preparations (including micelle solution); the preparation and characterization of electrodes modified with polymers, nanoelectrodes for sensors application and nanomaterials for electrochemistry; the structural and thermophysical properties of complex fluids (colloids, liquid crystals, polymers); the study of the interaction of proteins in solutions at secondary and tertiary level of description;

the synthesis of thin films by radiofrequency magnetron (co)sputtering deposition; the preparation of metal-doped glass films by conventional and field-assisted solid state ion exchange; the preparation and characterization of metal nanocluster composite glasses; the design, preparation and physico-chemical characterization of ordered mesoporous materials obtained by surfactant-assisted syntheses and of low-dimensional nanostructured oxide systems. Characterization includes Z-scan measurement, TEM, SEM, XRD, SAXS, XRPD, TPR-TPO, N<sub>2</sub>physisorption, FT-IR and DRIFT-IR, catalytic tests.

## **UNIVERSITY OF PADOVA – PHYSICS**

The group of Materials Science of the Department of Physics of Padova University works on fundamental and applied research on optical materials and semiconductor materials. Within the field of nanoscience and nanotechnology the group is focused on the formation of new composites by using different techniques as ion implantation, chemical synthesis, laser ablation. This was done in polymeric or insulating matrices containing metal and metal-alloy nanoparticles for plasmonic, optical and magnetic properties. Studies on ferroelectric materials are focused on diffusion processes and modification of optical properties. In the applied research, the focus is in the areas of optical devices as switching, interferometers and optical memories, gas sensors, hydrogen storage, new magnetic materials. The Group built an apparatus for the synthesis of Lithium Niobate crystals and constructed a Mach-Zehnder interferometer by using ion implantation. In the field of nanotechnology the main applications are in the area of sensors, nonlinear optics, biomedicine, energy, plasmonic. The laboratories are devoted to sputtering deposition, Czochralski growth of crystals, optical characterization, structural and compositional characterization.

In the Department of Chemical Sciences of the University of Padova research activities are pursued by a total of about 60 faculties organized in several groups with expertise in inorganic, organic, physical, computational and surface chemistry. Specific subjects include: surface reactivity and catalysis by nanostructured materials, nanoelectrochemistry, self-assembled and functional nanostructures, oxide nanoparticles and nanowires, fullerene and carbon nanotubes, metal nanoparticles and patterned metal surfaces. The ongoing research projects are focused on several specific areas of application, such as nanophotonics for ICT, chemical sensing and biosensing, biomedical imaging, organic photovoltaics and fuel cells. The Department hosts specialized laboratories endowed with the most advanced techniques for surface spectroscopies, structure analysis, probe microscopes, optical and nonlinear optical characterization, fast and ultrafast dynamics performed with nanosecond and femtosecond laser systems coupled with confocal microscope and a computational chemistry laboratory devoted to computational and theoretical chemistry through a wide range of theoretical approaches and computational techniques.

#### **UNIVERSITY OF PADOVA – MECHANICAL ENGINEERING**

The Department of Mechanical Engineering includes a Materials Sector where different research subjects are developed, from hydrogen storage to structural porous ceramics, to nanomaterials. There are three main research groups in the DIM-SM: Sol-Gel and Nanotechnology, Porous Ceramics and Glassceramics, Hydrogen Group. The labs are equipped with X-ray Diffraction for powders and thin films, different spectroscopies (FT-IR, Raman and Micro Raman, UV-VIS-NIR, Spectroscopic Ellipsometry), Thermal Analysis (DTA, TGA, Differential dilatometry, Impedance spectroscopy), Mechanical tests (Instron, microhardness, elastic modulus), facilities for the synthesis of materials (sol-gel, chemical methods, high energy ball milling), porosimetry, Sievert's volumetric type Gas Reaction Controller.

The Sol-Gel and Nanotechnology group is focused on the synthesis of hybrids organic-inorganic and inorganic glass materials doped with nanoparticles and/or organic molecules. Different synthesis methods for nanocrystals (both semiconductor and metal) have been developed, with the aim of their introduction in sol-gel glass matrices. Different nanostructured materials were obtained and structurally tested. The Porous Ceramics and Glass-Ceramics group works on the development and characterization of porous ceramics from preceramic polymers using novel processing procedures, the development and characterization of hierarchical porosity ceramic components from preceramic polymers, the use of commercially available cellular ceramics for diverse applications (substrate for bacteria colonies, blast protection, specialized filters,...) and new and innovative glassy materials. The Hydrogen Group is devoted to materials for hydrogen storage, structure and properties of materials of metallurgical interest, mechanical and heat treatments of metals and alloys, surface treatments by means of ion-beams and pulsed-laser irradiation, magnetic and structural properties of amorphous metallic films and of metal/metal interfaces, disordered structures obtained by the sol-gel method and high energy ball milling.

The research in Nanotech Laboratory in the Department of Information Engineering is focused on the characterization and reliability study of electronic nanodevices, like the study of reliability and failure mechanisms of Si and compound semiconductor devices. Targeted topics are the investigation of degradation mechanisms of high-k dielectrics and of ultra-shallow junctions, the failure mechanisms due to hot carrier, high temperature and high electric fields in High Electron Mobility Transistors (HEMTs), the failure mechanisms of GaN-based optoelectronic devices, the experimental characterization of the radiation hardness of Si and III-V semiconductor devices, the experimental characterization, modelling and reliability of Micro Electro Mechanical Systems (MEMS), the study of stability, failure modes and mechanisms of organic semiconductor materials (LEDs, transistors and solar cells).

The laboratory is equipped with DC and RF probe stations for measurements on devices on wafer and semiconductor parameter analyzers to measure their I-V characteristics. The laboratory is also equipped with climatic chambers, ovens, a furnace up to 1200°C in vacuum or in controlled atmosphere, a cryostat from 10K to RT, humidity test chamber (from -60°C to 180°C), Alpha particle source (241Am) and a profilometer for MEMS characterization. Optical characterization of the devices is carried out by means of a fiber-optic spectrometer, optical power meters with integrating spheres and a fiber-optic solar simulator (for the analysis of solar cells).

**Data gathered**

- **NANOFAB**

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE</b> (Short description of the institution)	Nanofab is the Venetian laboratory for research on nanotechnologies applied to materials. It is one of the first Italian laboratories for nanotechnology transfer to industrial production and one of the most advanced technology platforms for the applications of scientific research to enterprises. Nanofab is part of the Italian Cluster for Nanotechnologies and was built between 2005 and 2007. Nanofab research activities are organized in public as well as private projects. Research is mainly focused on surface treatments, nanostructured polymers, powder metallurgy, sensors and biosensors. Nanofab laboratories are equipped with 3 clean rooms and more than 80 instruments. Among them, vacuum deposition chambers PVD and PECVD, atmospheric plasma treatments, polymer extruders, high velocity compaction press and some advanced characterization tools like atomic force, electron and optical microscopes, photoluminescence and laser spectroscopy analysis, compositional analysis and many others. All these activities and laboratories have been fully funded by the Veneto Region Government with more than 25 MLN euros.		
	<b>CONTACT DETAILS</b>	Contact person	Ing. DIEGO BASSET	
		Position	General Director	
		e-mail	<a href="mailto:d.basset@nanofab.it">d.basset@nanofab.it</a>	
		Tel.	+390415093896	
		Fax	+390415093990	
		website of the institution	<a href="http://www.nanofab.it">www.nanofab.it</a>	
	<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	25	
		Number of Students	8	
		Number of Technicians	1	
Number of Scientific Visitors		5 visiting scientists per year (just short visits)		
Internal Mobility Programme (Y/N)		N		
<b>RESEARCH POTENTIALITY</b>	Research areas	Coatings, surface treatments, polymers, powder metallurgy, sensors and biosensors		
	Number Publications	25		
	Number Patents	5		
	Number contracts with Industry	~ 120		
	Main research projects	9		
	International Collaborations (Existing and Potential)	Club Cold Spray, VINF (Virtual Institute of NanoFilms), Universities (UK, Canada, Australia)		
<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	Name of the facility/lab	Nanofab (Nanofabrication Facility)	
		Address	Vega Science Park - Torre Hammon Via delle Industrie, 5 30175 - Marghera (VE) – ITALY	
		Contact person	PhD. FRANCESCO ENRICH	
		e-mail	<a href="mailto:enrichi@civen.org">enrichi@civen.org</a>	
		Tel.	+390415094281	
		website	<a href="http://www.nanofab.it/it/laboratori/">http://www.nanofab.it/it/laboratori/</a>	

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	1800
	Number of machines	80
	Usage rate	70%
	List of the main equipment	Physical Vapour Deposition (sputtering), Plasma Enhanced Chemical Vapour Deposition (2 machines), Cold Spray, Atmospheric Plasma, High Velocity Compaction press, polymer extruder, polymer discontinuous mixer, high vacuum furnace, tubular furnace, Secondary Electron Microscope, Scanning Probe Microscope (3 machines), Scanning Near Field Optical Microscope, optical and metallographic microscopes, CW and pulsed lasers, spectrofluorimeter, optical absorption, tribometer, nanoindenter, roughness meters, rheometer, contact angle machine, Glow Discharge Optical Emission Spectrometer, Inductively Coupled Plasma, thermal analysis, Glove Box, stirred reactor, electronic analysis equipments, electrochemical equipment, DNA microarray spotter and scanner.
	Do you offer technical support? (Y/N)	Y

<b>EXPERTISE</b>	Technical Expertise	Vacuum depositions, cold spray, atmospheric plasma, nanostructured polymers, powder metallurgy, optics and photonics, scanning probe microscopes, sensors, DNA microarray
	Application areas	Protective coatings, anticorrosion, self-cleaning, gas barrier properties, packaging, high mechanical performances, biological sensing, diagnostic applications, food control and environmental monitoring
	Tecnologies	Vacuum deposition (PVD, PECVD), atmospheric plasma, cold spray, polymer laboratory (extruders, press machines, characterizations), powder metallurgy (high velocity compaction press, characterizations), optical laboratory (lasers, confocal microscope, scanning near field microscope), characterization equipments (scanning probe microscopes, electron microscopy,...), sensors and biosensors, DNA microarray
		Is available for commercial use/can companies access? (Y/N)

- **UNIVERSITY OF VENICE – MATERIAL SCIENCES**

INSTITUTION	<b>INSTITUTION PROFILE</b> (Short description of the institution)	The University of Venice has settled a new laboratory of Materials Science devoted to the study of nanosystems. The research activity is focused on different fields: the preparation and characterization of nanostructured systems with luminescence and catalytic properties obtained by different chemical preparations (including micelle solution); the preparation and characterization of electrodes modified with polymers, nanoelectrodes for sensors application and nanomaterials for electrochemistry; the structural and thermophysical properties of complex fluids (colloids, liquid crystals, polymers); the study of the interaction of proteins in solutions at secondary and tertiary level of description; the synthesis of thin films by radiofrequency magnetron (co)sputtering deposition; the preparation of metal-doped glass films by conventional and field-assisted solid state ion exchange; the preparation and characterization of metal nanocluster composite glasses; the design, preparation and physical-chemical characterization of ordered mesoporous materials obtained by surfactant-assisted syntheses and of low-dimensional nanostructured oxide systems. Characterization includes Z-scan measurement, TEM, SEM, XRD, SAXS, XRPD, TPR-TPO, N <sub>2</sub> physisorption, FT-IR and DRIFT-IR, catalytic tests.		
	<b>CONTACT DETAILS</b>	Contact person	Prof. ALVISE BENEDETTI	
		Position	Full professor	
		e-mail	<a href="mailto:benedett@unive.it">benedett@unive.it</a>	
		Tel.	+39 0412348544- +39 0412346744	
		Fax	+39 0412348594	
		website of the institution	<a href="http://www.unive.it">www.unive.it</a>	
	<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Professors, Researchers and Post Docs)	25	
		Number of Students	20	
		Number of Technicians	10	
Number of Scientific Visitors		4		
Internal Mobility Programme (Y/N)		N		
<b>RESEARCH POTENTIALITY</b>	Research areas	Energy, photonic, soft matter, sensors, luminescent materials for medical application		
	Number Publications	100		
	Number Patents	1		
	Number contracts with Industry	10		
	Main research projects	Efficiency improvement of silicon-based solar cells by modification of the solar spectrum.(Funded by the Italian Ministry of Economic development). Executive Programme of scientific and technological co-operation between the Italian Republic and the Republic of India.		

<b>International Collaborations (Existing and Potential)</b>	<p>B.Richards, Eliott Watt University, Edimburgh UK. J-S. Pedersen Aarhus Universituy, DK.. B.Jagannadh Indian Institute of Chemical Technology. Hyderabad - India. A.Craievich S.Paolo University, Brasil. Department of Chemical and Material Science , Tokyo Institute of Technology, Japan.Institut de Microélectronique Electromagnétisme et Photonique-Institut Polytechnique de Grenoble, France. GILDA beamline, European Synchrotron Radiation Facility, Grenoble, France.Fred Lado, Noth Carolina State University, USA .Jayanth Banavar, PennState University, USA .Andres Santos, Universidad de Extremadura, Spain .Steve Benight, Portland State University, USA .V.F. Morozov, Yerevan University, Armenia -Guy Denuault, School of Chemistry University of Southampton UK. Patrick Unwin Department of Chemistry University of Warwick U.K.</p>
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<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	<b>Name of the facility/lab</b>	LabSTM
		<b>Address</b>	Via Torino 155/b- 30172 Mestre Venezia
		<b>Contact person</b>	Benedetti Alvisè
		<b>e-mail</b>	<a href="mailto:benedett@unive.it">benedett@unive.it</a>
		<b>Tel.</b>	+39 0412348544
		<b>website</b>	<a href="http://www.unive.it">www.unive.it</a>
	<b>EQUIPMENTS</b>	<b>Area/Space m<sup>2</sup></b>	3000
		<b>Number of machines</b>	30
		<b>Usage rate</b>	60%
		<b>List of the main equipment</b>	Radiofrequency magnetron (co)sputtering deposition chamber, conventional and field-assisted solid state ion exchange equipment, Z-scan measurements, TEM, SEM, XRD, SAXS, XRPD, TPR-TPO, N <sub>2</sub> physisorption, FT-IR and DRIFT-IR, catalytic tests.
		<b>Do you offer technical support? (Y/N)</b>	Y
	<b>EXPERTISE</b>	<b>Technical Expertise</b>	vacuum deposition techniques, electron microscopy, X-ray diffraction, Electrochemistry, Catalysis test
		<b>Application areas</b>	nanoscience, sensor, catalysis, optical materials
		<b>Tecnologies</b>	Electron microscope, PVD, WAXS, SAXS, Radiofrequency magnetron (co)sputtering deposition, conventional and field-assisted solid state ion exchange equipment ,IR, Catalytic tests, Z-scan, nanosensors
		<b>Is available for commercial use/can companies access? (Y/N)</b>	Y

- **UNIVERSITY OF PADOVA – PHYSICS**

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE</b> (Short description of the institution)	The group of Materials Science of the Department of Physics of Padova University works on fundamental and applied research on optical materials and semiconductor materials. Within the field of nanoscience and nanotechnology the group is focused on the formation of new composites by using different techniques as ion implantation, chemical synthesis, laser ablation. This was done in polymeric or insulating matrices containing metal and metal-alloy nanoparticles for plasmonic, optical and magnetic properties. Studies on ferroelectric materials are focused on diffusion processes and modification of optical properties. In the applied research, the focus is in the areas of optical devices as switching, interferometers and optical memories, gas sensors, hydrogen storage, new magnetic materials. The Group built an apparatus for the synthesis of Lithium Niobate crystals and constructed a Mach-Zehnder interferometer by using ion implantation. In the field of nanotechnology the main applications are in the area of sensors, nonlinear optics, biomedicine, energy, plasmonic. The laboratories are devoted to sputtering deposition, Czochralski growth of crystals, optical characterization, structural and compositional characterization.													
	<b>CONTACT DETAILS</b>	<table border="1"> <tr><td>Contact person</td><td>Prof. PAOLO MAZZOLDI</td></tr> <tr><td>Position</td><td>Full Professor, Responsible of research Group</td></tr> <tr><td>e-mail</td><td><a href="mailto:mazzoldi@padova.infm.it">mazzoldi@padova.infm.it</a></td></tr> <tr><td>Tel.</td><td>+390498277002</td></tr> <tr><td>Fax</td><td>+390498277003</td></tr> <tr><td>website of the institution</td><td><a href="http://www.fisica.unipd.it/">http://www.fisica.unipd.it/</a></td></tr> </table>	Contact person	Prof. PAOLO MAZZOLDI	Position	Full Professor, Responsible of research Group	e-mail	<a href="mailto:mazzoldi@padova.infm.it">mazzoldi@padova.infm.it</a>	Tel.	+390498277002	Fax	+390498277003	website of the institution	<a href="http://www.fisica.unipd.it/">http://www.fisica.unipd.it/</a>	
	Contact person	Prof. PAOLO MAZZOLDI													
	Position	Full Professor, Responsible of research Group													
e-mail	<a href="mailto:mazzoldi@padova.infm.it">mazzoldi@padova.infm.it</a>														
Tel.	+390498277002														
Fax	+390498277003														
website of the institution	<a href="http://www.fisica.unipd.it/">http://www.fisica.unipd.it/</a>														
<b>SCIENTIFIC PERSONNEL PROFILE</b>	<table border="1"> <tr><td>Number of PhDs (Researchers and Post Docs)</td><td>7</td></tr> <tr><td>Number of Students</td><td>3</td></tr> <tr><td>Number of Technicians</td><td>2</td></tr> <tr><td>Number of Scientific Visitors</td><td></td></tr> <tr><td>Internal Mobility Programme (Y/N)</td><td>N</td></tr> </table>	Number of PhDs (Researchers and Post Docs)	7	Number of Students	3	Number of Technicians	2	Number of Scientific Visitors		Internal Mobility Programme (Y/N)	N				
Number of PhDs (Researchers and Post Docs)	7														
Number of Students	3														
Number of Technicians	2														
Number of Scientific Visitors															
Internal Mobility Programme (Y/N)	N														
<b>RESEARCH POTENTIALITY</b>	<table border="1"> <tr><td>Research areas</td><td>Nanoscience, Nanotechnologies, optical sensors, ferroelectric materials, light waveguides, plasmonics.</td></tr> <tr><td>Number Publications</td><td>About 20 per year</td></tr> <tr><td>Number Patents</td><td>1</td></tr> <tr><td>Number contracts with Industry</td><td>3</td></tr> <tr><td>Main research projects</td><td>2 EU projects, 4 National projects, 2 regional projects</td></tr> <tr><td>International Collaborations (Existing and Potential)</td><td>Laboratories from Germany, France, India, Russia</td></tr> </table>	Research areas	Nanoscience, Nanotechnologies, optical sensors, ferroelectric materials, light waveguides, plasmonics.	Number Publications	About 20 per year	Number Patents	1	Number contracts with Industry	3	Main research projects	2 EU projects, 4 National projects, 2 regional projects	International Collaborations (Existing and Potential)	Laboratories from Germany, France, India, Russia		
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<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	<table border="1"> <tr><td>Name of the facility/lab</td><td>Nanostructure and ferroelectric materials laboratory, ion implantation Laboratory</td></tr> <tr><td>Address</td><td>Department of Physics, University of Padova Via marzolo 8 35131 Padova, ITALY</td></tr> <tr><td>Contact person</td><td>Mazzoldi Paolo</td></tr> <tr><td>e-mail</td><td><a href="mailto:mazzoldi@padova.infm.it">mazzoldi@padova.infm.it</a></td></tr> <tr><td>Tel.</td><td>+390498277002</td></tr> <tr><td>website</td><td><a href="http://www.fisica.unipd.it">http://www.fisica.unipd.it</a></td></tr> </table>		Name of the facility/lab	Nanostructure and ferroelectric materials laboratory, ion implantation Laboratory	Address	Department of Physics, University of Padova Via marzolo 8 35131 Padova, ITALY	Contact person	Mazzoldi Paolo	e-mail	<a href="mailto:mazzoldi@padova.infm.it">mazzoldi@padova.infm.it</a>	Tel.	+390498277002	website	<a href="http://www.fisica.unipd.it">http://www.fisica.unipd.it</a>
	Name of the facility/lab	Nanostructure and ferroelectric materials laboratory, ion implantation Laboratory													
	Address	Department of Physics, University of Padova Via marzolo 8 35131 Padova, ITALY													
	Contact person	Mazzoldi Paolo													
	e-mail	<a href="mailto:mazzoldi@padova.infm.it">mazzoldi@padova.infm.it</a>													
	Tel.	+390498277002													
website	<a href="http://www.fisica.unipd.it">http://www.fisica.unipd.it</a>														

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	1000
	Number of machines	20
	Usage rate	60%
	List of the main equipment	Sputtering deposition equipment, Czochralski growth furnace for crystals, UV-Vis absorption spectroscopy, photoluminescence excitation, emission and time resolved, laser spectroscopy, nonlinear optical measurements, Secondary Ion Mass Spectrometry, X-Ray Diffraction. Moreover, at the National INFN Laboratories (Legnaro, 10 km from Padova) the Group has access to the Ion Implanter and to the utilization of high energy accelerator for Rutherford Backscattering analysis. Finally the Group has an advanced experience in Electron Microscopy, by using the facility of CNR-Bologna.
	Do you offer technical support? (Y/N)	Y
<b>EXPERTISE</b>	Technical Expertise	Optics, Electron Microscopy, X-ray Diffraction, Crystal growth, Ion implantation, Microanalytical and microstructural analysis.
	Application areas	Nanoscience, optical sensors, ferroelectric materials, light waveguides, plasmonics.
	Tecnologies	Crystal growth (Czochralski ), Ion Implantation, Sputtering, Conventional and rapid thermal annealing
	Is available for commercial use/can companies access? (Y/N)	Y

- UNIVERSITY OF PADOVA –CHEMICAL SCIENCES**

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE</b> (Short description of the institution)	In the Department of Chemical Sciences of the University of Padova research activities are pursued by a total of about 60 faculties organized in several groups with expertise in inorganic, organic, physical, computational and surface chemistry. Specific subjects include: surface reactivity and catalysis by nanostructured materials, nanoelectrochemistry, self-assembled and functional nanostructures, oxide nanoparticles and nanowires, fullerene and carbon nanotubes, metal nanoparticles and patterned metal surfaces. The ongoing research projects are focused on several specific areas of application, such as nanophotonics for ICT, chemical sensing and biosensing, biomedical imaging, organic photovoltaic and fuel cells. The Department hosts specialized laboratories endowed with the most advanced techniques for surface spectrosopes, structure analysis, probe microscopies, optical and nonlinear optical characterization, fast and ultrafast dynamics performed with nanosecond and femtosecond laser systems coupled with confocal microscope and a computational chemistry laboratory devoted to computational and theoretical chemistry through a wide range of theoretical approaches and computational techniques.	
	<b>CONTACT DETAILS</b>	Contact person	Prof. RENATO BOZIO
		Position	full professor, Vice-Rector for research of the University of Padua
		e-mail	<a href="mailto:renato.bozio@unipd.it">renato.bozio@unipd.it</a>

	Tel.	0039 0498275681 (Department office) 0039 0498273030 (Rectorate office)
	Fax	0039 0498275681
	website of the institution	<a href="http://www.chimica.unipd.it">www.chimica.unipd.it</a>
<b>RESEARCH POTENTIALITY</b>	Research areas	nanophotonics for ICT, chemical sensing and biosensing, biomedical imaging, organic photovoltaic and fuel cells
<b>EQUIPMENTS</b>	List of the main equipment	Surface spectrometers (UPS, XPS, XE-AES), structure analysis (XRD, XRR), probe microscopes (AFM and STM), optical (UV-VIS, IR, fluorescence, Raman and Micro-Raman) and nonlinear optical characterization, fast and ultrafast dynamics performed with nanosecond (excimer laser and a dye laser, Nd:Yag laser and OPO) and femtosecond (Spectra Physics: Tsunami+Spitfire+OPA) laser systems coupled with confocal microscope. Moreover the group has a laboratory for computational chemistry: it is devoted to computational and theoretical chemistry through a wide range of theoretical approaches and computational techniques.

• **UNIVERSITY OF PADOVA –MECHANICAL ENGINEERING**

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE</b> (Short description of the institution)	<p>The Department of Mechanical Engineering includes a Materials Sector where different research subjects are developed, from hydrogen storage to structural porous ceramics, to nanomaterials. There are three main research groups in the DIM-SM: Sol-Gel and Nanotechnology, Porous Ceramics and Glassceramics, Hydrogen Group. The labs are equipped with X-ray Diffraction for powders and thin films, different spectrometers (FT-IR, Raman and Micro Raman, UV-vis-NIR, Spectroscopic Ellipsometry), Thermal Analysis (DTA, TGA, Differential dilatometry, Impedance spectroscopy), Mechanical tests (Instron, microhardness, elastic modulus), facilities for the synthesis of materials (sol-gel, chemical methods, high energy ball milling), porosimetry, Sievert's volumetric type Gas Reaction Controller.</p> <p>The Sol-Gel and Nanotechnology group is focused on the synthesis of hybrids organic-inorganic and inorganic glass materials doped with nanoparticles and/or organic molecules. Different synthesis methods for nanocrystals (both semiconductor and metal) have been developed, with the aim of their introduction in sol-gel glass matrices. Different nanostructured materials were obtained and structurally tested. The Porous Ceramics and Glass-Ceramics group works on the development and characterization of porous ceramics from preceramic polymers using novel processing procedures, the development and characterization of hierarchical porosity ceramic components from preceramic polymers, the use of commercially available cellular ceramics for diverse applications (substrate for bacteria colonies, blast protection, specialized filters,...) and new and innovative glassy materials. The Hydrogen Group is devoted to materials for hydrogen storage, structure and properties of materials of metallurgical interest, mechanical and heat treatments of metals and alloys, surface treatments by means of ion-beams and pulsed-laser irradiation, magnetic and structural properties of amorphous metallic films and of metal/metal interfaces, disordered structures obtained by the sol-gel method and high energy ball milling.</p>

<b>CONTACT DETAILS</b>	Contact person	Prof. MASSIMO GUGLIELMI
	Position	Full professor
	e-mail	<a href="mailto:massimo.guglielmi@unipd.it">massimo.guglielmi@unipd.it</a>
	Tel.	+39 049 8275509
	Fax	
	website of the institution	<a href="http://www.dim.unipd.it/materiali/">www.dim.unipd.it/materiali/</a>

<b>RESEARCH POTENTIALITY</b>	Research areas	nanomaterials, porous ceramics and Glassceramics, Hydrogen storage
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<b>EQUIPMENTS</b>	List of the main equipment	X-ray Diffraction equipments for both powders and thin films, different spectrosopes (FT-IR, Raman and Micro Raman, UV-vis-NIR, Spectroscopic Ellipsometry), Thermal Analysis (DTA, TGA, Differential dilatometry, Impedance spectroscopy), Mechanical tests (Instron, microhardness, elastic modulus), facilities for the synthesis of materials (sol-gel, nanopowders by chemical methods, nanopowders by high energy ball milling), porosimetry, Sievert's volumetric type Gas Reaction Controller.
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● **UNIVERSITY OF PADOVA –INFORMATION ENGINEERING**

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE</b> (Short description of the institution)	<p>The research in Nanotech Laboratory in the Department of Information Engineering is focused on the characterization and reliability study of electronic nanodevices, like the study of reliability and failure mechanisms of Si and compound semiconductor devices. Targeted topics are the investigation of degradation mechanisms of high-k dielectrics and of ultra-shallow junctions, the failure mechanisms due to hot carrier, high temperature and high electric fields in High Electron Mobility Transistors (HEMTs), the failure mechanisms of GaN-based optoelectronic devices, the experimental characterization of the radiation hardness of Si and III-V semiconductor devices, the experimental characterization, modelling and reliability of Micro Electro Mechanical Systems (MEMS), the study of stability, failure modes and mechanisms of organic semiconductor materials (LEDs, transistors and solar cells).</p> <p>The laboratory is equipped with DC and RF probe stations for measurements on devices on wafer and semiconductor parameter analyzers to measure their I-V characteristics. The laboratory is also equipped with climatic chambers, ovens, a furnace up to 1200°C in vacuum or in controlled atmosphere, a cryostat from 10K to RT, humidity test chamber (from -60°C to 180°C), Alpha particle source (241Am) and a profilometer for MEMS characterization. Optical characterization of the devices is carried out by means of a fiber-optic spectrometer, optical power meters with integrating spheres and a fiber-optic solar simulator (for the analysis of solar cells).</p>
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<b>CONTACT DETAILS</b>	Contact person	Prof. ALESSANDRO PACCAGNELLA
	Position	Full Professor and Director of the Department of Information Engineering
	e-mail	<a href="mailto:alessandro.paccagnella@dei.unipd.it">alessandro.paccagnella@dei.unipd.it</a>
	Tel.	+39 0498277686
	Fax	+39 0498277699
	website of the institution	<a href="http://www.dei.unipd.it">www.dei.unipd.it</a>

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	8
	Number of Students	8
	Number of Technicians	1
	Number of Scientific Visitors	1 per year
	Internal Mobility Programme (Y/N)	N

<b>RESEARCH POTENTIALITY</b>	Research areas	characterization and reliability study of electronic nanodevices and compound semiconductor devices
	Number Publications	100 per year
	Number Patents	3
	Number contracts with Industry	5 per year
	Main research projects	10 per year
	International Collaborations (Existing and Potential)	20 per year

<b>CONTACT DETAILS</b>	Name of the facility/lab	Nanotech Laboratory
	Address	Via Gradenigo 6/b, 35131 Padova
	Contact person	Prof. Alessandro Paccagnella
	e-mail	<a href="mailto:alessandro.paccagnella@dei.unipd.it">alessandro.paccagnella@dei.unipd.it</a>
	Tel.	+39 0498277686
	website	<a href="http://www.dei.unipd.it">www.dei.unipd.it</a>

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	200 m <sup>2</sup> (soon 300 m <sup>2</sup> )
	Number of machines	120
	Usage rate	80%
	List of the main equipment	6 DC and RF probe station for DC and pulsed measurements on devices on wafer and 6 semiconductor parameter analyzers to measure their I-V characteristics. Burn-in system for laser (ILX lightwave LDC3916R, 16 channel controller, from 10°C to 80°C , from 0 to 500mA) and one for packaged transistors. Two climatic chambers (from -200°C to +350°C), 2 BINDER ovens (from RT to 300°C), a furnace from RT to 1200°C with the possibility of measurements in vacuum or in controlled atmosphere, a cryostat (Oxford 1204) from 10K to RT, humidity test chamber VCL7003 (Weiss Technik Italia) (from -60°C to 180°C). A Alpha particle source (241Am) and a Polytech MSA-500 profilometer for MEMS characterization, topography and out of plane and in plane vibration studies. The optical characterization of the devices is carried out by means of a fiber-optic spectrometer (range 180-780 nm), two optical power meters with integrating spheres (analysis on LEDs and lasers), a Light-Emission Microscope (HAMAMATSU PHEMOS) and a fiber-optic solar simulator (for the analysis of solar cells).



# KEEN Regions

	Do you offer technical support? (Y/N)	Y
EXPERTISE	Technical Expertise	Characterization, reliability and failure analysis of nanodevices
	Application areas	Nanoscience, optical sensors, microwave devices, LED and lasers devices, compound semiconductor devices.
	Tecnologies	Optical and electrical characterizations; reliability test equipments for LED and transistors, profilometer, device parasitic effect determination
	Is available for commercial use/can companies access? (Y/N)	Y



## BASQUE CLUSTER

### The regional framework

The main poles of research and knowledge in the Basque Country are represented by Research Centres and nanoGUNE.

CIC nanoGUNE, Cooperative Research Centre in Nanosciences, is a new R&D centre which was created in 2006 to coordinate, develop and manage the research activities in the fields of nanoscience and nanotechnology in the Basque Country.

CIC nanoGUNE has also been given the name of Consolider (it has been recognised as the first Consolider centre in Spain), which is awarded by the Spanish Ministry of Science and Innovation to those centres that have been set up under the Consolider-Ingenio 2010 Program.

CIC nanoGUNE is structured by a newly created physical core and its own personnel and infrastructure. It is aimed at opening new nanoscience and nanotechnology research spaces and has a virtual section that strengthens the existing research in nanoscience and nanotechnology in the Basque Country and in which the following organisations are included:

- The Donostia International Physics Centre (DIPC) and the Mixed Physics Centre for Materials CSIC-UPV/EHU.
- The Polymat University Institute and different groups and departments from the University of the Basque Country UPV/EHU.
- Nanotechnology research groups from TECNALIA Corporation: LABEIN and INASMET.
- Nanotechnology research groups from IK4 Research Alliance: CIDETEC, CEIT, TEKNIKER, LEIA and GAIKER.
- R&D companies' units are expected to be gradually included in nanoGUNE's virtual cooperative research centre (CIC), in order to reach a higher level of direction towards applications in their research activities.

### Main actors interviewed

#### NanoGUNE

The Nanoscience Cooperative Research Center nanoGUNE Consolider has been created in the framework of two important initiatives launched by the Department of Industry of the Basque Government. The first is the so-called nanoBasque Strategy, designed for the development of a new economy sector in the Basque Country that would be enabled by nanotechnology.

The second is a network of Cooperative Research Centers launched in order to: (i) create an effective framework of cooperation in strategic research areas in the Basque Country, (ii) strengthen interdisciplinary basic and applied world-class research in those areas, and (iii) provide technology transfer to the industrial environment.

NanoGUNE is also a Consolider center, which means that its creation has been partially funded by the Spanish Consolider program, aimed at big projects at the frontiers of science performed by consolidated research groups that are expected to lead Spanish science in a given field.

NanoGUNE is a new center, with the mission of performing world-class nanoscience research for the competitive growth of the Basque Country. Its activities will include world-class research in nanoscience and nanotechnology, the generation of new infrastructures, the promotion of high-level training, international cooperation, communication and outreach, technology transfer, and the promotion of nanotechnology as an enabling tool that should increase the competitiveness of the Basque industry.

NanoGUNE's research activity will be initially implemented within the following major areas of strategic research: (i) nanomagnetism, (ii) nanooptics, (iii) self-assembly, (iv) nanobiotechnology, and (v) nanodevices. Its nanomagnetism laboratory focuses primarily on the fabrication and characterization of thin layers and multilayered materials with an impact on information technologies.

The nanooptics laboratory focuses on near-field optical microscopy and characterization, instrumental development, and applications in materials science (including semiconductor technology and biology) and photonics (including optical antennas and metamaterials).

The self-assembly laboratory focuses on the synthesis and chemical functionalization of nanostructures. The nanobiotechnology laboratory focuses primarily on the use of nanocrystals and quantum dots for biomedical applications. And, finally, the nanodevices laboratory focuses on carbon-based spintronics, non-volatile memory devices, hybrid multifunctional devices, and complex materials including strongly correlated oxides.

Progress in nanoscience research is only possible if one can actually fabricate nanoscale materials and measure their properties on the nanometer scale and with sufficiently high sensitivity. Thus, one key challenge was to build a unique infrastructure, free of electromagnetic interference (EMI), with an ultralow level of vibration and acoustical noise, and ultra-clean rooms available. In order to achieve this goal and host state-of-the-art facilities (including e-beam lithography, scanning-tunneling, atomic-force, nearfield-optical and high-resolution electron microscopes, and a dual-beam focused ion beam) for nanoscience research, a complex working team was put together, with experienced architects and engineers, and vibration, EMI, and clean-room consultants.

The nanoGUNE building, located at the Campus of Ibaeta of the University of the Basque Country in San Sebastian, is a building of 6,200 m<sup>2</sup> that includes 15 ultra-sensitive laboratories in the basement and a clean room of about 300 m<sup>2</sup> for nanofabrication.

Last but not least, nanoGUNE is a research center committed to the industrial fabric of the Basque Country. Hence, nanoGUNE's research activity is oriented, in particular, to increase the competitiveness of existing companies and enable the creation of new companies. To achieve this objective, the research performed at nanoGUNE will be constantly assessed to pursue potential applications and an effective transfer to the field of technological development

CIDETEC (Centre for Electrochemical Technologies) was created in 1997 as a non-profit Foundation whose mission is to serve both the industrial sectors related to electrochemistry and the administration and society in general. Its core activity being the field of applied research. CIDETEC is a member of the IK4 technology alliance between applied R&D centres in the Basque Country. CIDETEC addresses all electrochemical technologies, applying its experience and know-how in three areas of activity: Energy, Surface Finishing and New Materials. CIDETEC has an annual turnover of 7M€ and at the present time employs 106 researchers. In particular, the New Materials Department is specialized in the synthesis and functionalization of speciality polymers such as electroactive polymers, polymeric ionic liquids, block copolymers and the functionalization of nanomaterials such as CNT's, fullerenes and inorganic micro-nanoparticle. And the application by printing technologies of these functional materials creating flexible a electrochemical devices as batteries, fuel cells, sensors and biosensors, actuators, electrochromic devices and solar cells. To carry on its activities CIDETEC has state-of-the-art technical facilities, 4000 m2 equipped laboratories (2008) including high scale fabrication processes and highly-qualified technical and research personnel able to conduct specialised services in research, development and innovation, technical assessment, technological diffusion, information sourcing and training.

## • nanoGUNE

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE</b> (Short description of the institution)	CIC nanoGUNE is a newly Center with R+D activity from December 2008, with the mission of addressing basic and applied world-class research in nanoscience and nanotechnology, fostering high-standard training and education of researchers in this field, and promoting the cooperation among Universities and Technological Centers and the industrial sector. CIC nanoGUNE focuses its research activities on the following four major strategic areas: 1-Physics of low-dimensional structures, nanostructures and nanoscale structured complex systems. 2-Synthesis, assembling, and nanofabrication of nanomaterials (nanoparticles, nanotubes, thin films, nanocomposites) and nanostructured materials. 3-Development of nanodevices and its impact on molecular electronics, spintronics, nanomagnetism, and nanophotonics. 4-Biofunctional nanoparticles and nanobiotechnology.		
	<b>CONTACT DETAILS</b>	<b>Contact Person</b>	Jose Maria Pitarke	
		<b>Position</b>	General Director	
		<b>e-mail</b>	<a href="mailto:jm.pitarke@nanogune.eu">jm.pitarke@nanogune.eu</a>	
		<b>Tel.</b>	34943574002	
		<b>Fax</b>	3,4944E+10	
		<b>website of the institution</b>	<a href="http://www.nanogune.eu">www.nanogune.eu</a>	
	<b>SCIENTIFIC PERSONNEL PROFILE</b>	<b>Number of PhDs (Researchers and Post Docs)</b>	17	
		<b>Number of Students</b>	12	
		<b>Number of Technicians</b>	7	
<b>Number of Scientific Visitors</b>		2		
<b>Internal Mobility Programme (Y/N)</b>		Yes		
<b>RESEARCH POTENTIALITY</b>	<b>Research areas</b>	1-Nanomagnetism: Focused on the development of electronic nanodevices and their impact on magnetism, spintronics and molecular devices. 2- Nanooptics: Focused on near-field optics, optoelectronics, plasmonics, the development of microscopic optical equipment, and the development of nanodevices and their effect on nanophotonics. 3-Self Assembly: Focused on the synthesis and chemical functionalization of nanostructures for their assembly in nanomaterials. 4-Nanobiotechnology: Focused on the area of biofunctional nanostructures and nanobiotechnology. 5-Nanodevices: Focused on the nanostructuring of a range of systems using advanced lithography and layer deposition techniques.		
	<b>Number Publications/Area</b>	1-Nanomagnetism: 23 Nanooptics: 6 Assembly: 2 Nanobiotechnology: 1 Nanodevices:1	2- 3-Self 4- 5-	
	<b>Number Patents/Area</b>	1-Nanomagnetism:1		

	<b>Number contracts with Industry</b>	2
	<b>Main research projects</b>	26
	<b>International Collaborations (Existing and Potential)</b>	<p>In collaboration:</p> <p>Reims Univ, France; Nantes Univ, France;  Marseille Univ. France;  Univ. of Rennes, France;  CRANN, Dublin, Ireland;  Trinity College, Dublin, Ireland;  Ludwig-Maximilians Univ. of Munich, Germany;  Dresden Technical Univ. Germany;  Institute of Photonics, Jena, Germany;  Kings College, London, UK; Oxford Univ. UK;  Univ. of York, UK; Ohio Univ., US;  Univ. of California, Irvine, US  Shermyakin-Ovchinnikov Institute of Bioorganic Chemistry, Moscow;  Engelhard Institute of Molecular Biology, Moscow;  Politecnico di Milano, Italy; Univ. of Ferrara, Italy;  ISMN CNR, Bologna, Italy; CNR, INFM, Italy;  Univ. Stuttgart, Germany;  Max Planck MF, Stuttgart, Germany;  Univ. Ulm, Germany; BASF, Germany;  Univ. Gdansk, Poland; Univ. Bonn, Germany;</p> <p>In the near future:</p> <p>CEMES, Toulouse, France; Univ. Paris 7, France;  Italian Institute of Technology IIT, Genova;  CNR-INFM, Lecce, Italy</p>

<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	<b>Name of the facility/lab</b>	Nanomagnetism
		<b>Address</b>	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		<b>Contact Person</b>	Dr. Andreas Berger
		<b>e-mail</b>	<a href="mailto:a.berger@nanogune.eu">a.berger@nanogune.eu</a>
		<b>Tel.</b>	34943574006
		<b>website</b>	<a href="http://www.nanogune.eu/en/research/nanomagnetism">http://www.nanogune.eu/en/research/nanomagnetism</a>
	<b>EQUIPMENTS</b>	<b>Area/Space m<sup>2</sup></b>	130
		<b>Number of machines</b>	4
		<b>Usage rate</b>	
		<b>List of the main equipment</b>	Magneto-optic Kerr effect (MOKE) setup for room temperature magnetization measurements; Kerr-microscope for real-time magnetic domain observation; UHV Sputter deposition system for film/multilayer fabrication (DC-, RF-, and reactive sputtering); SQUID-Vibrating Sample Magnetometer for high precision magnetometry (2-400 K)
	<b>Do you offer technical support? (Y/N)</b>	YES	
	<b>EXPERTISE</b>	<b>Technical Expertise</b>	Ultrahigh vacuum deposition; film and multilayer growth; ferromagnetic materials, magnetometry, magneto-optical measurements

	Application areas	magnetic films and multilayers, magnetic nanostructures
	Tecnologies	magnetic films and nanostructures for storage and bio-medical applications
	Is available for commercial use/can companies access? (Y/N)	YES

FACILITIES / LABS	CONTACT DETAILS	Name of the facility/lab	Nanooptics
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		Contact Person	Dr. Rainer Hillenbrand
		e-mail	<a href="mailto:r.hillenbrand@nanogune.eu">r.hillenbrand@nanogune.eu</a>
		Tel.	34943574007
		website	<a href="http://www.nanogune.eu/en/research/nanooptics">http://www.nanogune.eu/en/research/nanooptics</a>
	EQUIPMENTS	Area/Space m <sup>2</sup>	90
		Number of machines	
		Usage rate	
		List of the main equipment	s-SNOM (based on AFM, at Visible-Mid-IR and THz frequencies). Mid-IR lasers (880-930 cm <sup>-1</sup> and 950-1100 cm <sup>-1</sup> ) Mid-IR detectors He Ne Laser THz gas laser
	Do you offer technical support? (Y/N)	YES	
	EXPERTISE	Technical Expertise	Yes
		Application areas	Nanophotonics, Plasmonics, Optical antennas, Nanoscale IR characterization of semiconductor devices and nanostructure materials
		Tecnologies	near-field microscopy
		Is available for commercial use/can companies access? (Y/N)	YES

FACILITIES / LABS	CONTACT DETAILS	Name of the facility/lab	Self Assembly
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		Contact Person	Dr. Alexander Bittner
		e-mail	<a href="mailto:a.bittner@nanogune.eu">a.bittner@nanogune.eu</a>
		Tel.	34943574008
		website	<a href="http://www.nanogune.eu/en/research/self-assembly">www.nanogune.eu/en/research/self-assembly</a>
	EQUIPMENTS	Area/Space m <sup>2</sup>	80

	Number of machines	1
	Usage rate	
	List of the main equipment	Electrospinning, infrared spectroscopy of surfaces, dyn. light scattering (zeta potential and sizing), atmospheric plasma system, nitrogen porosimeter, AFM/STM
	Do you offer technical support? (Y/N)	YES
<b>EXPERTISE</b>	Technical Expertise	Electrospinning, spectroscopy, electron and optical lithography, electrochemistry, supercapacitors, SEM, TEM, AFM, STM
	Application areas	Fundamental research on soft matter, electrospinning, supercapacitors and batteries, drug delivery
	Tecnologies	Health, supercapacitors and batteries, energy storage, traction (automotive)
	Is available for commercial use/can companies access? (Y/N)	YES

<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	Name of the facility/lab	Nanobiotechnology
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		Contact Person	Marie Fertin
		e-mail	<a href="mailto:m.fertin@nanogune.eu">m.fertin@nanogune.eu</a>
		Tel.	34943574020
		website	<a href="http://www.nanogune.eu/en/research/nanobiotechnology">www.nanogune.eu/en/research/nanobiotechnology</a>
	<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	42
		Number of machines	8
		Usage rate	
		List of the main equipment	FP-6600 JASCO Fluorescence Spectrometer; PERKIN ELMER Victor X 5 Multilabel Plate Reader; UV/Vis Spectrometer JASCO V-630Bio; Flow Cytometer BECKMAN COULTER CyAn™ ADP Analyzer; Confocal Laser Scanning Microscope CARL ZEISS LSM 710; Centrifuge BECKMAN COULTER AVANTI J-26 XPI; J-815 JASCO Circular Dichroism Spectrometer with Magnetic Circular Dichroism, Linear Flow Dichroism and Stopped Flow Options; KODAK Image Station 4000 MM; Cell culture facilities.
	Do you offer technical support? (Y/N)	YES	
	<b>EXPERTISE</b>	Technical Expertise	YES
Application areas		Ultrasensitive detection and diagnostics.	
Tecnologies		Nanolab-on-a-bead and nanolab-on-a-chip technologies with semiconductor and magnetic nanoparticles.	

	Is available for commercial use/can companies access? (Y/N)	YES
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<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	Name of the facility/lab	Nanodevices
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		Contact Person	Dr.Luis Hueso
		e-mail	<a href="mailto:l.hueso@nanogune.eu">l.hueso@nanogune.eu</a>
		Tel.	34943574011
		website	<a href="http://www.nanogune.eu/en/research/nanodevices">www.nanogune.eu/en/research/nanodevices</a>
	<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	
		Number of machines	
		Usage rate	
		List of the main equipment	HF Probe Station (Structural Characterization of films, multilayers and powder samples. Electrical characterization of ultrathin films and nanodevices) Dual Chamber Evaporation System (Grow of high-quality ultrathin films and multilayers. Metallic and insulating materials. Templates and layers structures for nanostructuring and devices) System for semiconducting characterization Nanovoltmeter and source Keithley
		Do you offer technical support? (Y/N)	
	<b>EXPERTISE</b>	Technical Expertise	
		Application areas	
		Tecnologies	
		Is available for commercial use/can companies access? (Y/N)	

<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	Name of the facility/lab	CLEAN ROOM
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		Contact Person	Gorka Pazos
		e-mail	<a href="mailto:g.pazos@nanogune.eu">g.pazos@nanogune.eu</a>
		Tel.	34943574016
		website	
	<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	300
		Number of machines	10
		Usage rate	
		List of the main equipment	E-beam Lithography Mask aligner Surface Profiler E-beam / thermal deposition system

		Elipsometer Reactive Ion Etcher Microscopes Benchtop SEM ALD (atomic Layer Deposition) Source and measurement device subfemtoampers
	Do you offer technical support? (Y/N)	
<b>EXPERTISE</b>	Technical Expertise	YES
	Application areas	Nanofabrication; nanocharacterization
	Tecnologies	Technologies supported by the equipment described above
	Is available for commercial use/can companies access? (Y/N)	YES

<b>FACILITIES / LABS</b>	<b>CONTACT DETAILS</b>	Name of the facility/lab	Microscopy Facility
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain
		Contact Person	Andrey Chuvilin
		e-mail	<a href="mailto:a.chuvilin@nanogune.eu">a.chuvilin@nanogune.eu</a>
		Tel.	34943574000
		website	
	<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	60
		Number of machines	1
		Usage rate	
		List of the main equipment	TEM (transmission electron microscope) available 10/2010; AFM (atomic force microscope); MFM (magnetic forec microscope); SEM (scanning electron microscopy); Dual Beam FIB (Dual beam Focused Ion beam) available 4/2010.
	Do you offer technical support? (Y/N)	YES	
	<b>EXPERTISE</b>	Technical Expertise	YES
		Application areas	Material characterization; biological sample characterization
		Tecnologies	Technologies supported by the equipment described above
		Is available for commercial use/can companies access? (Y/N)	YES

<b>LINE S / LAB</b>	<b>CONTACT DETAILS</b>	Name of the facility/lab	General Tools
		Address	CIC nanoGUNE, Avenida de Tolosa 76, 20018 Donostia-San Sebastian, Spain

	<b>Contact Person</b>	Gorka Pazos
	<b>e-mail</b>	<a href="mailto:g.pazos@nanogune.eu">g.pazos@nanogune.eu</a>
	<b>Tel.</b>	34943574016
	<b>website</b>	
<b>EQUIPMENTS</b>	<b>Area/Space m<sup>2</sup></b>	
	<b>Number of machines</b>	
	<b>Usage rate</b>	
	<b>List of the main equipment</b>	PPMS (Physical Property Measurement System); XRD (X-ray Diffractometer for growth and processing control during film/multilayer fabrication); RAMAN spectroscopy; Magnetometer (measures hysteresis loops, magnetic moment, magnetic susceptibility of films multilayers and assembly of nanostructures).
	<b>Do you offer technical support? (Y/N)</b>	YES
<b>EXPERTISE</b>	<b>Technical Expertise</b>	YES
	<b>Application areas</b>	Nanomagnetism, nanooptics, self assembly, nanodevices and nanobiotechnology
	<b>Tecnologies</b>	Technologies supported by the equipment described above.
	<b>Is available for commercial use/can companies access? (Y/N)</b>	YES

• **CIDETEC**

<b>INSTITUTION PROFILE</b> (Short description of the institution)	<p>CIDETEC (Centre for Electrochemical Technologies) was created in 1997 as a non-profit Foundation whose mission is to serve both the industrial sectors related to electrochemistry and the administration and society in general. Its core activity being the field of applied research. CIDETEC is a member of the IK4 technology alliance between applied R&amp;D centres in the Basque Country. CIDETEC addresses all electrochemical technologies, applying its experience and know-how in three areas of activity: Energy, Surface Finishing and New Materials. CIDETEC has an annual turnover of 7M€ and at the present time employs 106 researchers. In particular, the New Materials Department is specialized in the synthesis and functionalization of speciality polymers such as electroactive polymers, polymeric ionic liquids, block copolymers and the functionalization of nanomaterials such as CNT's, fullerenes and inorganic micro-nanoparticle. And the application by printing technologies of these functional materials creating flexible a electrochemical devices as batteries, fuel cells, sensors and biosensors, actuators, electrochromic devices and solar cells. To carry on its activities CIDETEC has state-of-the-art technical facilities, 4000 m2 equipped laboratories (2008) including high scale fabrication processes and highly-qualified technical and research personnel able to conduct specialised services in research, development and innovation, technical assessment, technological diffusion, information sourcing and training.</p>	

<b>CONTACT DETAILS</b>	<b>Contact Person</b>	David Mecerreyes
	<b>Position</b>	Head of Nanotechnology Unit
	<b>e-mail</b>	<a href="mailto:dmecerreyes@cidetec.es">dmecerreyes@cidetec.es</a>
	<b>Tel.</b>	34943309022

	Fax	34943309136
	website of the institution	<a href="http://www.cidetec.es">www.cidetec.es</a>

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	35
	Number of Students	10
	Number of Technicians	20
	Number of Scientific Visitors	0
	Internal Mobility Programme (Y/N)	N

<b>RESEARCH POTENTIALITY</b>	Research areas	Energy (batteries and fuel cells), Surface Finishing (Coatings and Processes), New Materials (Nanotechnology, Biomaterials and Sensors&Photonics)
	Number Publications/Area	50
	Number Patents/Area	1-3
	Number contracts with Industry	30-50
	Main research projects	50
	International Collaborations (Existing and Potential)	CNR (Bari), CNRS (Bordeaux), IMEC, UCL-London, IBM Almaden (USA), Oxford University (UK), ACREO, CEA-LITEN, Fraunhofer ISC, University of the Basque Country, Universidad Carlos III, CSIC.

<b>CONTACT DETAILS</b>	Name of the facility/lab	New Materials Department
	Address	Paseo Miramon 196
	Contact Person	David Mecerreyes
	e-mail	<a href="mailto:dmecerreyes@cidetec.es">dmecerreyes@cidetec.es</a>
	Tel.	34943309022
	website	<a href="http://www.cidetec.es">www.cidetec.es</a>

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	4000
	Number of machines	50
	Usage rate	75%
	List of the main equipment	AFM, TEM, SEM, Potentiostat-Galvanostat (various), DMA, TGA, DSC, FTIR, UV-NIR, Coulter, MALDI-TOF, Elemental Analysis, Mini-extruder, Polymer blending and processing equipment, printing equipment (screen printing).
	Do you offer technical support? (Y/N)	Y

<b>EXPERTISE</b>	<b>Technical Expertise</b>	Electrochemistry, new materials (organic such as polymers and inorganic, metals, inorganic oxides), devices (batteries, fuel cells, sensors, electrochromics, photonics, third generation solar cells) nanoobjects (nanoparticles, nanotubes, nanowire arrays, quantum dots)
	<b>Application areas</b>	Energy, Automotive Industry, Biomedicine, transport, plastic, chemical, electronics
	<b>Tecnologies</b>	Batteries, fuel cells, solar cells, biomaterials, nanomaterials, nanocoatings, nanocomposites, nanoadditives
	<b>Is available for commercial use/can companies access? (Y/N)</b>	Y

## RHÔNE-ALPES CLUSTER

### The regional framework

Rhone Alpes, and in particular the Grenoble area is the France's second largest hub for government-funded research after Paris and home to 21,000 research jobs. The research infrastructures and competences are mainly concentrated in micro and nanotechnology with huge and impressive laboratories such as CEA LETI, the laboratory for Electronics and Information Technology, and Liten, the laboratory for Innovation in New Energy Technologies and Nanomaterials.

### Main actors interviewed

#### CEA-LETI

CEA-LETI, the Laboratory for Electronics & Information Technology is operated by Direction de la Recherche Technologique at CEA, the French Atomic Energy Commission. It mainly aims at helping companies to increase their competitiveness through technological innovation and transfer of its technical know-how to industry. Major player in the MINATEC Micro-Nano technologies innovation centre.

CEA-LETI benefits from 8000 m<sup>2</sup> state-of-the-art clean rooms, with equipment worth some 160 million euro. It is currently employing some 1600 people among whom 1100 CEA employees and co-workers of various status including 100 people from industrial partners, working in the CEA-LETI premises within the framework of bilateral collaborations. Overall, research contracts with industry are worth 75% of CEA-LETI annual income. It has a very important patents portfolio, and filed last year more than 200 patents and 700 publications. The laboratory is structured into six departments, with a specific department operating 24-7, the technological facilities of the silicon technology platform, and five program-oriented programs covering the field of microelectronics, microsystems, optronics, system design and Telco, and technologies for bio and health.

And within CEA LETI the following laboratories/research groups were analysed:

- Leti technology operations
- Leti Bio
- Leti Design & wireless
- Leti photonics
- Leti Heterogeneous integration
- Leti µelectronic

## **LITEN**

Liten (laboratory for Innovation in New Energy Technologies and Nanomaterials) is a CEA institute located for the most part in Grenoble and Chambéry (on the INES site). It's one of Europe's newest and most important research centres in the new energy technology field. It works to support the nation's efforts to diversify its energy mix through more effective use of renewables, in particular to meet energy requirements in transport, housing and mobile electronics.

And within LITEN the following laboratories/research groups were analysed:

- Liten nanosafety
- Liten characterization
- Liten LTS nanosurfaces

Data gathered

- CEA-LETI

<b>INSTITUTION PROFILE</b> (Short description of the institution)	<p>CEA-LETI, the Laboratory for Electronics &amp; Information Technology is operated by Direction de la Recherche Technologique at CEA, the French Atomic Energy Commission. It mainly aims at helping companies to increase their competitiveness through technological innovation and transfer of its technical know-how to industry.</p> <p>Major player in the MINATEC Micro-Nanotechnologies innovation centre, CEA-LETI benefits from 8000 m2 state-of-the-art clean rooms, with equipment worth some 160 million euro. It is currently employing some 1600 people among whom 1100 CEA employees and co-workers of various status including 100 people from industrial partners, working in the CEA-LETI premises within the framework of bilateral collaborations. Overall, research contracts with industry are worth 75% of CEA-LETI annual income. It has a very important patents portfolio, and filed last year more than 200 patents and 700 publications. The laboratory is structured into six departments, with a specific department operating 24-7 the technological facilities of the silicon technology platform, and five program-oriented programs covering the field of microelectronics, microsystems, optronics, system design and telco, and technologies for bio and health.</p>
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<b>CONTACT DETAILS</b>	<b>Contact Person</b>	Hervé Fanet
	<b>Position</b>	University coordination - Europeans projects
	<b>e-mail</b>	<a href="mailto:herve.fanet@cea.fr">herve.fanet@cea.fr</a>
	<b>Tel.</b>	(+33438784819
	<b>Fax</b>	(+33438789414
	<b>website of the institution</b>	<a href="http://www.leti.fr">www.leti.fr</a>

<b>SCIENTIFIC PERSONNEL PROFILE</b>	<b>Number of PhDs (Researchers and Post Docs)</b>	746
	<b>Number of Students</b>	155
	<b>Number of Technicians</b>	315
	<b>Number of Scientific Visitors</b>	
	<b>Internal Mobility Programme (Y/N)</b>	yes

<b>RESEARCH POTENTIALITY</b>	<b>Research areas</b>	see each labos
	<b>Number Publications/Area</b>	776 (2008)
	<b>Number Patents/Area</b>	259 (2008)
	<b>Number contracts with Industry</b>	20 common laboratories, 350/year
	<b>Main research projects</b>	see each labos
	<b>International Collaborations (Existing and Potential)</b>	CSEM (CH), Fraunhofer (μ D); VTT , Caltech (US)

- **Leti technology operations**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	124
	Number of Students	15
	Number of Technicians	117
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	microelectronics
	Number Publications/Area	81
	Number Patents/Area	7 (2008)
	Number contracts with Industry	37,14 M€ (62,4 M€ in global)
	Main research projects	24 european and national levels projects.
	International Collaborations (Existing and Potential)	DT ; IMEC; Lausanne polytechnic school

<b>CONTACT DETAILS</b>	Name of the facility/lab	DPTS (silicium technologies)
	Address	17 rue des martyrs F 38000 Grenoble
	Contact Person	Nanocharacterisation N Gambarcorti
	e-mail	narciso.gambacorti@cea.fr
	Tel.	(+) 33 438782249
	website	www.leti.fr

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	1766 m <sup>2</sup>
	Number of machines	472
	Usage rate	contact us
	List of the main equipment	characterisation : TOF SIMS, DUV Elipso, TEM UHR, SEM UHR, SPM UHV, FIB DB, RX, CD SEM, TEM HR, MEIS, FIB DB, NanoEsca...
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	nanocharacterisation
	Application areas	memories, 3D, lithography, sensors, NEMS, packaging, RF, substrates, nanoelectric devices, ...
	Tecnologies	200mm CMOS and Beyond CMOS, $\mu$ systems; 300mm advance modules ; more than Moore ; characterisation in and off line (nanoscale characterization)
	Is available for commercial use/can companies access? (Y/N)	yes

- **Leti Bio**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	105
	Number of Students	20
	Number of Technicians	37
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	Detectors, In vivo electronics, wearable electronics, Lab-on-Chip, Molecular Imaging
	Number Publications/Area	119
	Number Patents/Area	43 (2008)
	Number contracts with Industry	14,2M€ (22,1M€ globally)
	Main research projects	50
International Collaborations (Existing and Potential)	member of european networks such as nano2Life...	

<b>CONTACT DETAILS</b>	Name of the facility/lab	DTBS (Biology and Health)
	Address	17 rue des martyrs F 38000 Grenoble
	Contact Person	Detectors : Jean Louis Amans In vivo electronic : Raymond Campagnolo wearable electronic : Coralie Gallis Lab on Chip : Claude Vauchier Molecular imaging : Patrick Boisseau
	e-mail	<a href="mailto:firstname.name@cea.fr">firstname.name@cea.fr</a>
	Tel.	(+) 33 438782249
	website	www.leti.fr

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	13100
	Number of machines	65
	Usage rate	contact us
	List of the main equipment	chemistry laboratory : gas phase salinization for 200 mm wafers, EWOD, NeuroImplants platform,
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	radiation detectors for medical imaging and homeland security, combining system integration and image processing, RM ingénierie, lab on chip for IVD (bio and chemical systems on chip), wearable and implantable devices for monitoring and treating health conditions (electrodes for brain stimulation), in vitro tissues recording.
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	Application areas	energy, biological sciences and healthcare: diagnostic, drug delivery, drug screening, environmental science,
	Tecnologies	µfluidics techniques, integrative chemistry processes, medical devices, fluorescence imaging,
	Is available for commercial use/can companies access? (Y/N)	yes

- **Leti Design & wireless**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	180
	Number of Students	46
	Number of Technicians	25
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	ICT : telecom, sensors and smart systems, integrated systems, RFID... Human sciences - Humanities
	Number Publications/Area	163
	Number Patents/Area	53
	Number contracts with Industry	32m€/37,8 M€ in global
	Main research projects	59
	International Collaborations (Existing and Potential)	EPFL, CSEM

<b>CONTACT DETAILS</b>	Name of the facility/lab	
	Address	17 rue des martyrs F 38000 Grenoble
	Contact Person	Design Ahmed jerraya Security and defense Alain Merle Telecoms Laurent Herault Smart devices Pierre-Damien Berger
	e-mail	<a href="mailto:firstname.name@cea.fr">firstname.name@cea.fr</a>
	Tel.	(+) 33 438782249
	website	<a href="http://www.leti.fr">www.leti.fr</a>

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	9672
	Number of machines	
	Usage rate	please contact us
	List of the main equipment	please contact us
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	sensors, smart devices, autonomous devices and low power consumption, microsystems, complete systems (design and simulation), TCAD simulation, techno 4G/4,5G, UFDMA, WIMAX, LTE and advanced, human and social factors (linked with MIL), 3D force sensors, tension sensors,
	Application areas	Health, multimedia, telecom, space, defence, security, building, transportation
	Tecnologies	RFID, UHF, UWB, antenna, RF components, M&NEMS, Germanium channel transistors, complex chips, wireless devices, wireless communications,
	Is available for commercial use/can companies access? (Y/N)	yes

- **Leti photonics**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	102
	Number of Students	16
	Number of Technicians	63
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	photonics
	Number Publications/Area	72
	Number Patents/Area	42
	Number contracts with Industry	28M€/35 M€
	Main research projects	18
	International Collaborations (Existing and Potential)	FhG (IMS & IOF), CSEM, EPFL

<b>CONTACT DETAILS</b>	Name of the facility/lab	DOPT
	Address	17 rue des martyrs F 38000 Grenoble
	Contact Person	IR detectors Gerard.Destefanis Imagers Valerie.Nguyen Phonics Laurent Fulbert Lighting Patrick Mottier
	e-mail	<a href="mailto:firstname.name@cea.fr">firstname.name@cea.fr</a>
	Tel.	(+) 33 438782249
	website	<a href="http://www.leti.fr">www.leti.fr</a>

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	9977
	Number of machines	mainly in cooled infrared
	Usage rate	
	List of the main equipment	please contact us
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	IR HgCdTe (EPL or EJM) = cooled infrared detectors; smart optic sensors, photonics components, optical imagers, microbolometers, optical communication, Flat panel display and OLED microdisplay, Lighting components (from LED technologies to full lighting systems), GAN nanowires MBE, connectic, smart sensors, camera on chip (wafer level), optic memories, storage class memories, LED lighting (ZnO packaging, )
	Application areas	security, night vision, cellular phones, cameras, telescopes, image sensors...
	Tecnologies	ultra high bright LEDs, controlling lighting, smart presence sensors, ultra low power technologies, photonics devices,
	Is available for commercial use/can companies access? (Y/N)	yes

- **Leti Heterogeneous integration**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	108
	Number of Students	10
	Number of Technicians	38
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	Hetereogeneous systems
	Number Publications/Area	104
	Number Patents/Area	53
	Number contracts with Industry	32 M€/38,4M€
	Main research projects	19
	International Collaborations (Existing and Potential)	FhG, CSEM, EPFL, Caltech, LIMMS Japan, TU Delft, IMEC, U Southampton, U Stuttgart, U Valecia, U Roma, U of Thessalonic, ....

<b>CONTACT DETAILS</b>	Name of the facility/lab	DIHS
	Address	17 rue des martyrs F 38000 Grenoble
	Contact Person	3D integration Mark Scannell Microsystems Jean Philippe Polizzi Packaging : Gérard Poupon RF components : Francois Perruchot
	e-mail	<a href="mailto:firstname.name@cea.fr">firstname.name@cea.fr</a>
	Tel.	(+) 33 438782249
	website	www.leti.fr

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	1192
	Number of machines	46
	Usage rate	contact us
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	Display technology (flat panel), RF, micro panel (WVGA); accelerometers ; OLED TFT & CMOS, Wafer Bonding 3D
	Application areas	packaging , MEMS, NEMS, M&NEMS, spintronic & Piezo, OLEDs, RF and Localization, hot spot access,...
	Tecnologies	accelerometers, Ion beam sputtering, passiv components, microswitch, switch RF, nano oscilators, 3D IC 300mm
	Is available for commercial use/can companies access? (Y/N)	yes

- **Leti pelectronic**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	121
	Number of Students	23
	Number of Technicians	29
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	microelectronic
	Number Publications/Area	237
	Number Patents/Area	61
	Number contracts with Industry	52,9M€ (54,3M€ in global)
	Main research projects	8

	<b>International Collaborations (Existing and Potential)</b>	ITY Japan, TUW Austria, Brauw center, Harvard, Tohoku, U Bologna, U Udine, Imec, U Liverpool, U Southampton, U grenade, U Glasgow, KTH, U Goteberg, MIT, Stanford, EPFL...
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<b>CONTACT DETAILS</b>	<b>Name of the facility/lab</b>	NANOTEC
	<b>Address</b>	17 rue des martyrs F 38000 Grenoble
	<b>Contact Person</b>	Beyon CMOS JC Gabriel Devices C Reita Lithography S Tedesco Materials JJ Aubert
	<b>e-mail</b>	<a href="mailto:firstname.name@cea.fr">firstname.name@cea.fr</a>
	<b>Tel.</b>	(+) 33 438782249
	<b>website</b>	www.leti.fr

<b>EQUIPMENTS</b>	<b>Area/Space m<sup>2</sup></b>	31537 m2
	<b>Number of machines</b>	75
	<b>Usage rate</b>	please contact us
	<b>Do you offer technical support? (Y/N)</b>	yes

<b>EXPERTISE</b>	<b>Technical Expertise</b>	advanced lithography (from advanced UV to massively parallel electron beam writing); maskless litho; Litho Shaped beam, multibeam, NanoInprint
	<b>Application areas</b>	More Moore and More than Moore substrates; NEMS ; Power devices...
	<b>Tecnologies</b>	Technologies : SOI ( BSOI, BeSOI), SI, FDSOI, DG MOS, GNR, FinFET, ... New substrates : Si, GeOI, highK, SiGE.
	<b>Is available for commercial use/can companies access? (Y/N)</b>	yes

● **LITEN**

<b>INSTITUTION</b>	<b>INSTITUTION PROFILE (Short description of the institution)</b>	Liten (laboratory for Innovation in New Energy Technologies and Nanomaterials) is a CEA institute located for the most part in Grenoble and Chambéry (on the INES site). It's one of Europe's newest and most important research centres in the new energy technology field. It works to support the nation's efforts to diversify its energy mix through more effective use of renewables, in particular to meet energy requirements in transport, housing and mobile electronics.	
	<b>CONTACT DETAILS</b>	<b>Contact Person</b>	Bertrand Fillon
		<b>Position</b>	programmes manager
		<b>e-mail</b>	<a href="mailto:bertrand.fillon@cea.fr">bertrand.fillon@cea.fr</a>
		<b>Tel.</b>	
		<b>Fax</b>	

	website of the institution	<a href="http://www.liten.fr">www.liten.fr</a>
<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	364
	Number of Students	
	Number of Technicians	186
	Number of Scientific Visitors	
	Internal Mobility Programme (Y/N)	yes
<b>RESEARCH POTENTIALITY</b>	Research areas	solar energy, low energy buildings, future transport applications (hydrogen, fuel cells and batteries), nanomaterials for energy and methods guaranteeing their safe use
	Number Publications/Area	
	Number Patents/Area	324 in portfolio
	Number contracts with Industry	350/year
	Main research projects	see each labos

- **Liten nanosafety**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	6
	Number of Students	1
	Number of Technicians	2
	Internal Mobility Programme (Y/N)	YES

<b>RESEARCH POTENTIALITY</b>	Research areas	nanomaterials chemistry and safety
	Number Publications/Area	4
	Number Patents/Area	1
	Number contracts with Industry	3

<b>CONTACT DETAILS</b>	Name of the facility/lab	nanomaterials chemistry and safety
	Address	17 rue des martyrs 38000 Grenoble
	Contact Person	Francois Tardif
	e-mail	<a href="mailto:francois.tardif@cea.fr">francois.tardif@cea.fr</a>
	Tel.	(+) 33 4 38 78 33 32
	website	<a href="http://www.liten.fr">www.liten.fr</a>

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	400m2
	Number of machines	XX
	Usage rate	contact us
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	nanoparticles behaviour, nanoparticules measurements, personal protection efficiency, exposure measurement
	Application areas	safe use of nanomaterials
	Tecnologies	detection (1nm), detection particles in biological tissue, using carbon nanotubes safely, protection of people, workstation monitoring, innovative tests particles, research on microleaks...
	Is available for commercial use/can companies access? (Y/N)	yes

- **Liten characterization**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	6
	Number of Students	0
	Number of Technicians	1
	Internal Mobility Programme (Y/N)	Y

<b>RESEARCH POTENTIALITY</b>	Research areas	Characterisation
	Number Publications/Area	1
	Number Patents/Area	0
	Number contracts with Industry	1

<b>CONTACT DETAILS</b>	Name of the facility/lab	Characterisation (part of LCPEM) on the same characterisation platform with leti
	Address	17 rue des martyrs 38000 Grenoble
	Contact Person	Cyril CAYRON
	e-mail	<a href="mailto:cyril.cayron@cea.fr">cyril.cayron@cea.fr</a>
	Tel.	(+) 33 38 78 93 29
	website	<a href="http://www.liten.fr">www.liten.fr</a>

<b>EQUIPMENTS</b>	Area/Space m <sup>2</sup>	see leti "technology operations"
	Number of machines	see leti "technology operations"
	Usage rate	contact us
	List of the main equipment	HRTEM Titan 300kV holography, tomography & corrected Cs STEM probe ; XPS and NanoEsca X PhotoElectron Emission Microscopy
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	same as leti in micro and nanocharacterisation but not in the same fields
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	Application areas	energy, materials sectors
	Tecnologies	
	Is available for commercial use/can companies access? (Y/N)	yes

- **Liten LTS nanosurfaces**

<b>SCIENTIFIC PERSONNEL PROFILE</b>	Number of PhDs (Researchers and Post Docs)	3
	Number of Students	1
	Number of Technicians	1
	Internal Mobility Programme (Y/N)	yes

<b>RESEARCH POTENTIALITY</b>	Research areas	surface technology
	Number Publications/Area	5
	Number Patents/Area	2
	Number contracts with Industry	

<b>CONTACT DETAILS</b>	Name of the facility/lab	surface technology LTS
	Address	17 rue des martyrs 38000 Grenoble
	Contact Person	Laurent Bedel
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	website	www.liten.fr

<b>EQUIPMENTS</b>	Usage rate	contact us
	List of the main equipment	Surface texturing equipments ; CVD precursors and etching gas ; PVD targets ; CVD equipments
	Do you offer technical support? (Y/N)	yes

<b>EXPERTISE</b>	Technical Expertise	nanomaterials, nanotexturation
	Application areas	energy performance, transport, electric systems, energy storage,
	Is available for commercial use/can companies access? (Y/N)	yes

### 1.3 Final considerations

Taking together all the collected information that will be the core of a website for networking as a resource of information to find the right partner /collaboration /technical expertise, we can extract at this stage some basic remarks, such as:

The research areas with more active projects /people evolved /technical expertise are:

- **Characterization**
- **Nanodevices**
- **Nanobiotechnology**
- **Photonics**
- **Sensors, detectors,**
- **Surface coatings**

The applications of the results are addressed to the following areas:

- **Biological Sensing (biomedicine, environment, security, defence)**
- **Energy**
- **Optical**
- **Packaging**
- **Transport**

The technical expertise derived from the focus on the research areas already mentioned above is difficult to be resumed in a deliverable, but it is clear a very interesting aspect of the website resource that once put in place should offer very interesting information for the partnership or technical expertise search in the scope of collaborations or services.