



## Europass Curriculum Vitae

### Personal information

First name(s) / Surname(s) **Munizer Purica**  
Address(es) National Institute for Research and Development in Microtechnologies – IMT Bucharest,  
126 A Erou Iancu Nicolae street, R-077190, Voluntari, Ilfov, Romania  
Telephone(s) +40-21.269.07.77 (ext. 28) +40-744539385  
E-mail munizer.purica@imt.ro  
Nationality Romanian  
Date of birth 24/12/1949

**Education and Degrees** **2001** Ph.D. in Condensed Matter Physics, University “Alexandru Ioan Cuza” Iasi . Thesis title:  
“Study of quantum detectors on bulk and multi-layered semiconductor materials”.  
**1973** MSc in Optics and Optical Spectroscopy, University “Alexandru Ioan Cuza” Iasi .

### Work experience

**Dates** **2005 – prezent**

Occupation or position held Senior Researcher (CS I) in Micro/Nano Photonics Laboratory ,  
Head of OPTOLAB Group.  
Associate Lecturer of Microsystem Master ( “Politehnica” University Bucharest)

Main activities and responsibilities

- Oxide nanostructures, ZnO and TiO<sub>2</sub> nanowires, nanorods and nanoparticles- conduction and transport mechanisms, optical and sensing properties,
- Sensing devices – gas sensors and photodetectors based on oxide nanostructured layers and their heterostructures: modeling/design, fabrication and characterization.
- High speed and sensitivity photodetectors, MSM type and Schottky barriers with transparent electrodes on Si and A<sup>3</sup>B<sup>5</sup> semiconductor compound.
- Transparent semiconducting oxides and device for Transparent Electronics: UV photodetectors, transparent thin films transistors (TTFT) based on thin layers of ZnO, ITO, TiO<sub>2</sub>, ITO:Zn, NiO.
- Inorganic/organic nanocomposites for photovoltaic applications: P3HT, PMMA polymers blended with carbon nanotubes, fullerenes, graphene nanosheets or metallic and oxide nanoparticles. Optical, electrical and structural characterization of nanocomposites by ellipsometry and micro-Raman spectroscopy.
- Raman spectroscopy of carbon nanomaterials -nanotubes (SWCNT, MWCNT), fullerenes, graphene nanosheets, oxide nanowires and hybrid nanocomposites.
- Responsible of Experimental Laboratory for optical and structural characterization using optical spectroscopy – ellipsometry, reflective spectrophotometry and Raman spectroscopy.
- Training by research PhD students

Name and address of employer National Institute for Research and Development in Microtechnologies – IMT Bucharest,  
126 A Erou Iancu Nicolae street, R-077190, Voluntari, Ilfov, Romania

Type of business or sector Research and development ;

**Dates** **2004 - 1997**

Occupation or position held	2004 – 2001 Senior Researcher (CS I) in Microphotonics Laboratory 2001 - 1996 Senior Researcher (CS II) in Microphotonics Laboratory ;
Main activities and responsibilities	<ul style="list-style-type: none"> <li>• Optical MEMS - movable micro mirrors on silicon substrate electrostatic and Bymorph actuated : modeling/analysis and structures design, tehnologies.</li> <li>• Tunable photodetectors with selective/amplified photoresponse based on photodiode integration with a Fabry-Perot micro-cavity on c-Si substrate for multichannel optical communications: modeling/design, fabrication and characterization.</li> <li>• Development of photodetectors on A<sup>3</sup>B<sup>5</sup> compound semiconductors including device physics, design/modelling, fabrication , materials and devices characterization. Most successful accomplishments includes single and multi-elemenets PIN photodiodes on InGaAs/InP, Schottky barrier photodetector and H<sub>2</sub> sensors on InP substrates.</li> <li>• 1-D and 2-D monolithically integrated photodetectors arrays on silicon substrate for multichannel detection systems and optical interconectctions.</li> </ul>
Name and address of employer	National Institute for Research and Development in Microtechnologies – IMT Bucharest, 126 A Erou Iancu Nicolae street, R-077190, Voluntari, Ilfov, Romania
Type of business or sector	Research and development ;
<b>Dates</b>	<b>1996 - 1984 ,</b>
Occupation or position held	Research Institute For Electronic Components (ICCE) , Bucharest, Erou Iancu Nicolae 32 B street
Main activities and responsibilities	<p>1996 – 1990 Senior Researcher (CS II) in Optoelectronics Laboratory ; 1990 – 1984 Senior Researcher ( CS III ) in Optoelectronics Laboratorul Associate Lecturer of Physics Department ( "Politehnica" University Bucharest)</p> <ul style="list-style-type: none"> <li>• Development of optoelectronic devices on c-Si substrates in planar and IC Technologies: <ul style="list-style-type: none"> <li>- high sensitivity and large spectral response photodiodes and phototransistors;</li> <li>- high speed PIN and APD photodiodea for optical communication and laser telemetry;</li> <li>- 1-D and 2-D monolithically integrated photodetectors arrays for multichannel detection systems and optical interconectctions.</li> <li>- liniar response photodetectors integrated with one or two stage amplification circuits in IC technology;</li> <li>- optical switches and optically coupled isolators;</li> <li>- sensor for ultraviolet radiations for radiometer applications.</li> </ul> </li> </ul> <p>Results: over 10 certified devices - PIN and APD photodiodes for optical communication and for laser telemetry, integrated photodetectors, optical switches and optically coupled isolators</p> <ul style="list-style-type: none"> <li>• Simulation/modeling and optimization of the photoresponse of optoelectronic devices on Si and A<sup>3</sup>B<sup>5</sup> compound semiconductors.</li> </ul>
Name and address of employer	Research Institute for Electronic Components (ICCE), 32 Bis Erou Iancu Nicolae street, Sector 2, Bucharest, Romania
Type of business or sector	Research and development ;
<b>Dates</b>	<b>1983 – Oct. 1973</b>

Occupation or position held	Research Institute For Electronic Components (ICCE) , Bucharest, Erou Iancu Nicolae 32 B street
Main activities and responsibilities	<p>1983 – 1977 Researcher in in Optoelectronics Laboratory 1977 – Oct. 1973 Physicist in Materials and Electronic devices Laboratory</p> <ul style="list-style-type: none"> <li>• Development of npn phototransistors on epitaxial silicon in planar technology: design, fabrication and characterization of high gain phototranzistor (ROL 31, ROL 32, ROL 33, ROL 34, ROL 36, ROL 034, ROL 033,...) and photovoltaic devices. Results: over 10 certified devices: high gain phototransistors, photodiodes and photovoltaic device for industrial applications.</li> <li>• Nuclear radiation effects on silicon electronic devices in the vicinity of the reactor during power operation. Determination a major impact of gamma ray and thermal neutrons on electrical parameters of silicon npn tranzistors and diodes tranzistoare (2N2906, 2N 91, 2N2977-tranzistors, ROD- 01-diodes).</li> <li>• Nuclear-photons (gamma) energy direct conversion cells based on p-n junction on silicon.</li> </ul>
Name and address of employer	Research and Design Centre for Electronic Components (CCPCE )- Baneasa 32 Erou Iancu Nicolae street, Sector 2, Bucharest, Romania.
Type of business or sector	Research and development
<b>Personal skills and competences</b>	
Mother tongue(s)	Romanian
Other language(s)	
Self-assessment	
<i>European level (*)</i>	
English	
French	
Social skills and competences	<ul style="list-style-type: none"> <li>• Ability to work in a multidisciplinary group of physicists , engineers and chemists .</li> </ul>

		Understanding		Speaking				Writing			
		Listening		Reading		Spoken interaction		Spoken production			
	English	B1	Independent user	B2	Proficient user	B1	Independent user	B1	Proficient user	B1	Independent user
	French	B1	Independent user	B2	Proficient user	A2	Basic user	A2	Basic user	A2	Basic user

(\*) [Common European Framework of Reference for Languages](#)

Organisational skills and competences

- Extensive experience in project coordination and management: over 25 national projects .

**Relevant projects:**

1. 1D and 2D ZnO based nanostructures and innovative technological processes for direct integration in gas sensing devices and UV radiation detection , (NANOZON), PNCD II, Nr. 27/ 2013-2017, **project coordinator**
2. Multifunctional zinc oxide-based nanostructures: from materials to devices (MULTINANOWIRES), FP7 related ERA-NET MNT project No.7-029/2010, , **responsabil team IMT partener**
3. PN II Processes and components based on oxidic and polymeric thin layers for Transparent Electronics and Optoelectronics, (ELOTRANSP), PNCD II project no. .12-128/2008, **project coordinator**
4. Development of a laboratory for optical and opto-electrical measurements according to european directives and standards (OPTOLAB), project CEEX, no. .97/2006, , **project coordinator**
5. Organic/inorganic nanocomposites for photovoltaics and detection devices, project CONVERT PN 09290208 , **project responsible**
6. ESA Project : PROBA-3 Coronagraph System , Occulter Position Sensor Emitter /OPSE Prime Contractor: **Centre Spatial de Liège** ([www.csl.ulg.ac.be](http://www.csl.ulg.ac.be)) Subcontractor for OPSE: National Institute for R&D in Microtechnologies - IMT Bucharest ([www.imt.ro](http://www.imt.ro)), Dr. Eng. Ileana Cernica, responsabil team IMT partener **Dr. Purica Munizer as team leader** for selection/evaluation and characterization of light emitting sources for space conditions operation.
7. Precise optical alignment systems for spacecraft formation flying and active debris removal OASYS, (<http://www.imt.ro/oasys/>), Contract Nr. 120/20.07.2017 (PN-III-P5-5.1-STAR-639/2017); Durata proiectului: 2017-2019, project **coordinator** Dr. Ileana CERNICA **Key person** – analysis emission and reception of optical radiation of the characteristics of the components in order to design and optimize the optical alignment systems for space operation.

- Head of the Experimental Laboratory/OPTOLAB for optical and structural characterization using optical spectroscopy – Raman spectroscopy, Spectroscopic ellipsometry and spectrophotometry.
- Member in the organizing committee of the International Conference Advanced Topics in optoelectronics Micro&Nanotechnologies- ATOM
- Supervisory experience: mentored and supervised undergraduate students on different research projects.

Technical skills and competences

**Major areas of expertise:**

- Development of new class of electronic and optoelectronic devices based on oxide nanostructures (1D and 2D) and related materials and on **innovative technological processes**
- Transparent Electronic: transparent thin films transistor (TTFT) and diode based on wide bandgap oxide semiconductors thin layers ( ZnO, TiO<sub>2</sub>, NiO, ZITO); gas sensors and UV detectors using ZnO nanowires .
- Optoelectronic devices on semiconductors - Si, A<sup>3</sup>B<sup>5</sup> and compounds ( photodetectors, phototransistors, Optoelectronic Integrated Circuits OEIC, optical sensors): modelling/design, technology and opto- electrical characterization. High speed photodetectors for optical communications and lasers systems.
- Photovoltaics devices on semiconductor substrates ( Si, InP ) and thin films solar cells .
- Technical skills in characterization techniques : UV\_VIS\_IR spectroscopy, Spectroscopic Ellipsometry and Raman spectroscopy.

<b>Awards</b>	<ul style="list-style-type: none"> <li>• “TRAIAN VUIA” AWARD OF ROUMANIAN ACADEMY in 1987 , for the “High speed photodetectors on silicon for optical communications systems”</li> <li>• “ EXCELANCE IN RESEARCH” - 2000 for “ Optical sensors technologies”</li> <li>• GOLD MEDALS in 2006 from X- edition of INVENTICA”, Bucharest, Romania for OSIM patent CBI OSIM nr: A200400761/06.09.2004 “<i>Procedeu de realizare microstructurifotonice de detectie cu cavitate optica pe substrat de siliciu</i>”,</li> <li>• “BEST PAPER AWARD “ at International Conference on Semiconductors (CAS), Romania in : 2005, 2003, 2002, 2001, 2000, 1999-1996.</li> </ul>
<b>Professional associations</b>	IEEE – ED (electron Devices) and LEOS member.
<b>Others</b>	<b>Referee:</b> <ul style="list-style-type: none"> <li>• Elsevier Journal - Thin Solid Films, Vacuum Journal, Applied Surface Science;</li> <li>• Project evaluator at National Research Programme –CEEX, PNCDI</li> <li>• Paper review board for CAS</li> </ul>
<b>Annexes</b>	Selected list of publications, books, patents

## ANNEXES

### • Selected list of ISI papers and ISI indexed Proceedings:

1. Viorica Musat,\* , Elvira Fortunato , **Munizer Purica** , Monica Mazilu , Anna Maria Botelh do Regod , Bogdan Diaconu, Tito Busani, “Multifunctional zinc oxide nanostructures for a new generation of devices”, **Materials Chemistry and Physics** 132 (2012) 339– 346
2. Elena Manea, Cosmin Obreja, **Munizer Purica** , Adrian Dinescu, Florin Comanescue, Vasilica Schiopuf, Elena Budianug, “Formation of Transparent Nanoporous Titanium Oxide Films on Glass Substrates using an Anodization Process”, *Journal of Nano Research Vol. 16 (2011) pp 113-118*
3. **M. Purica**, F. Iacomi, C. Baban, P. Prepelita, N. Apetroaei, D. Mardare and D. Luca, “Investigation of structural properties of ITO thin films deposited on different substrates”, **Thin Solid Films**, vol. 515, 24, 15 October, 2007, pp. 8674-8678
4. **M. Purica**, E. Budianu, E. Rusu, P Arabadji, “*Electrical Properties of the CdS/InP Heterostructures for Photovoltaic Applications*”, **Thin solid films, issn: 0040-6090** , 511-512, 2006, PAG. 468-472.
5. Elena Manea, Elena Budianu, **Munizer Purica**, Ileana Cernica , Florin Babarada, “ *Technological process for a new silicon solar cells struture with honeycomb textured front surface*”, **Solar energy materials & solar cells, ISSN 0927-0248, VOLUME 90, ISSUES 15, 2006, PAG. 432-431.**
6. F. Iacomi, **M. Purica**, E. Budianu, P. Prepelita, D. Macovei, “ *Structural studies on some doped CdS thin films deposited by thermal evaporation*”, **Thin Solid Films**, 511 – 512 (2006), Pages 468 – 472.
7. E. Budianu, **M. Purica** , F.Iacomi, C. Baban, P. Prepelita, E. Manea “ *Silicon Metal-Semiconductor-Metal Photodetector with Zinc Oxide Transparent Conducting Electrodes*” , (2008), **Thin Solid Films** Volume: 516 Issue: 7 Pages: 1629-1633.
8. Manea, E. Budianu, **M. Purica**, D. Cristea, I. Cernica, R.Muller, “ *Optimization of front surface texturing processes for high efficiency silicon solar cells*”, **Solar energy materials & solar cells, ISSN 0927– 0248, VOL.87, ISSUES 1-4, 2005, PAG. 423-431.**
9. **M. Purica**, E. Budianu, E. Rusu, M.Danila, R. Gavrilă, “ *Optical and structural investigation of ZnO thin films prepared by chemical vapour deposition*”, **Thin solid films, ISSN: 0040-6090** , 403-404, **2002**, PAG. 485-488.
10. Dana Cristea, **Munizer Purica**, Elena Manea and Viorel Avramescu, “ *Experiments for microphotonic components fabrication using Si <111> etching technique*”, **Sensors and actuators, a: physical, ISSN 0924–4247, NO. 99, 2002, PAG. 92-97.**
11. Elena Budianu, **Munizer Purica**, Elena Manea, Emil Rusu, Raluca Gavrilă, Mihai Danila, “ *Optical improved structure of polycrystalline silicon based thin film solar cell*”, **Solar energy materials and solar cells, ISSN 0927 – 0248, VOL. 72, 2002, PAG. 223-229.**
12. **Munizer Purica**, Elena Budianu, Emil Rusu, “*ZnO thin films on semiconductor substrate for large area photodetector applications*”, **Thin solid films, ISSN: 0040-6090, VOL. 383, 2001, PAG. 284-286.**

13. **Munizer Purica**, Elena Budianu, Emil Rusu, "Heterojunction with ZnO polycrystalline thin films for optoelectronic devices applications", **Microelectronic engineering** 51-52, ISSN: 0167-9317, 2000, pag. 425-431.
14. Elena Budianu, **Munizer Purica**, E. Rusu, " Heterostructures on InP for high-speed detection devices over a large spectral range (0.8 - 1.6)  $\mu\text{m}$ ", **Microelectronic engineering** 51-52, ISSN: 0167-9317, 2000, pag. 393-400.
15. Nesheva, D.;Comanescu, F.; Bineva, I.; **Purica, M.**; Aneva, Z.; Muller, R., " Raman Study of Compositional Variations in  $\text{Zn}_x\text{Cd}_{1-x}\text{Se}$  Films Prepared by Thermal Vacuum Evaporation", JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY Volume: 16 Issue: 8 Pages: 8513-8518 Published: AUG 2016.
16. C. Moldovan, C. Mihailescu, D. Stan, L. Ruta, R. Iosub, R. Gavrilă, **M. Purica**, S. Vasilica, "Characterization of self-assembled monolayers (SAMs) on silicon substrate comparative with polymer substrate for Escherichia coli O157:H7 detection", Applied Surface Science, 2009, Volume 255, Issue 22, Pages 8953-8959.
17. P. Obreja, D. Cristea, **M. Purica**, R. Gavrilă, F. Comanescu, Polymers doped with metal oxide nanoparticles with controlled refractive index, **Polimery**, Pages: 679-685, 52, 2007.
18. E. Budianu, R. Muller, **M. Purica**, L. Eftime, R. Skarvelakis, G. Kiriakidis, " Optical sensor with transparent conductive oxides electrodes for microposition detection applications ", **Thin Solid Films**, 2009, Volume 518, Issue 4, Pages 1057-1059.
19. E. Manea, C. Obreja, **M. Purica**, A. Dinescu, F. Comanescu, V. Schiopu, E. Budianu, "Formation of Transparent Nanoporous Titanium Oxide Films on Glass Substrates using an Anodization Process ", Journal of Nano Research, Volume 16 2011, Pages 113-118.
20. M. Florea-Spiroiu, D. Achimescu, I. Stanculescu, **M. Purica**, R. Gavrilă, S. Peretz, "Anti-fog chitosan/sodium lauryl ether sulfate films", **Polymer Bulletin** Volume: 70 Issue: 12, DEC. 2013, Pages: 3305-3316.
21. E. Manea, C. Atalin Corneliu; **Purica, Munizer, E. Budianu, F. Comanescu**, "Antireflective Coatings with Nanostructured  $\text{TiO}_2$  Thin Films for Silicon Solar Cells", **Journal of Nano Research**, Volume 21, 2013, Pages: 89-94.
22. Cismaru, A Muller, G. Konstantinidis, F. Comanescu, **M. Purica**, A. Stefanescu, A Stavrinidis, A Dinescu, A Moldoveanu, "Residual stress distribution and deflection analysis of very thin GaN membrane supported devices "Journal of Micromechanics and Microengineering Volume: 23 (2013), Issue: 1 Article Number: 015010 .
23. A. Pantazi, S. Palade, C. Berbecaru, **M. Purica**, A. Matei, O. Oprea, D. Dragoman, " Dielectric properties of multiwall carbon nanotube- red silicone rubber composites" **Journal of Optoelectronics and Advanced Materials**, 2015, Volume 17, Issue 9-10 Pages: 1319-1324.
24. V. Musat\*, M. Mazilu, N. Tigau, P. Alexandru, A. Dinescu, **M. Purica\*** "Effect of doping concentration and temperature on the morphology, crystallinity and electrical conductivity of Al:ZnO nanostructured films grown from aqueous solution , Thin solid films Volume: 617 , Pages: 120-125 , 2016 .
25. Comanescu, Florin; Istrate, Anca; **Purica, Munizer** , "Assessing by Raman spectroscopy the quality of CVD graphene transferred on oxidized silicon and quartz substrates", ROMANIAN JOURNAL OF INFORMATION SCIENCE AND TECHNOLOGY Volume: 22 Issue: 1, Pages: 30-40 Published: 2019 .
26. V. Musat\*, A. Filip, N. Tigau, R. Dinica , E. Herbei, C. Romanitan, I. Mihalache, **M. Purica\***, 1D nanostructured ZnO layers by Microwaves – Assisted Hydrothermal Synthesis ", REVISTA DE CHIMIE\_ Volume: 69 Issue: 10 Pages: 2788-2793 Published: OCT 2018

• **Books:**

1. **Munizer Purica**, Elena Budianu , OPTOELECTRONIC DETECTING DEVICES, editure: **PRINTECH (cod CNCIS: 54)**, București 2007, **ISBN 978-973-718-642-3**,
2. **Munizer Purica**, Elena Budianu , PHOTONIC MICROSTRUCTURE FOR RADIATION DETECTION BASED ON THIN FILMSUBTIRI, editure: **PRINTECH (cod CNCIS: 54)**, București 2007, **ISBN 978-973-718-645-4**.

• **Patents:**

1. OSIM Patent No: 122387/2009 "**Fabrication procedure of photodetector integrated with optical microcavity on silicon substrate**" **CBI OSIM nr: A /200400761 / 06.09.2004**,  
Authors: **Purica Munizer**, Budianu Elena, Manea Elena,  
Gold medal at the 10th edition of the INVENTICA Salon, October 3-7, 2006, Bucharest
2. OSIM Patent No: 122515/2009 , "**Fabrication procedure of high efficiency solar cells**" **CBI OSIM**, nr. A / 00749 / 27.09.2006,  
Authors: Manea Elena, Podaru Cecilia, Budianu Elena, **Purica Munizer**, Coraci Antonie