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54 publicatii – 18Q1, 24Q2, 12Q3  
351 de citari din care 137 in reviste din Q1

#### Patents

**55. Procedeu de pasivare a suprafetelor semiconductoare din compusi III-V si obtinerea unei structuri senzitive de tip GaCl<sub>3</sub>-Sb<sub>2</sub>S<sub>3</sub>/GaSb**, Ghita R, Frumosu F, Logofatu C, Predoi D, **Negrila C. C.**, Trupina L, Brevet OSIM RO131881, 29.03.2019

**56. Procedeu de pasivare a suprafetei de n-GaSb(100)**, R. Ghita, C. Logofatu, **C.C. Negrila**, F. Frumosu, D. Predoi, Brevet OSIM Nr. 132453, 28.08.2020

**57. Procedeu de realizare a unei structuri fotoactive**, R. Ghita, C. Logofatu, **C.C. Negrila**, M.D. Mihai, D. Predoi, M. Stoicu, Brevet OSIM Nr. 133228, 28.02.2020

Dr. **Adela Nicolaev** is currently a scientific researcher III in the Surface and Interface Science Laboratory at the National Institute of Materials Physics in Măgurele, Ilfov, Romania. She began her scientific career by completing her Bachelor of Science (B.Sc.) in 2008 at the Faculty of Physics, University of Bucharest focusing on advanced techniques for monitoring conservation and restoration of works of art using the laser under the guidance of Prof. Dr. Tudor Marian and Roxana Radvan from INOE (National Research and Development Institute for Optoelectronics). She pursued a Master of Science (M.Sc.) at the same institution. During this period, she started to specialize in *ab initio* modelling, graduating in 2010 under the supervision of Prof. Dr. Alexandru Nemnes.

She earned her Ph.D. in Physics at the Physics Faculty of University of Bucharest in 2013. Her doctoral thesis, supervised by Professor Dr. Stefan Antohe, focused on the "Ab initio studies in the  $A_{II}B_{VI}$  semiconductors". During her phd she earned a scholarship POSDRU /1.5/107/S/80765 and in 2012 she had a research stage for eight months at Laboratoire des Solides Irradies, Ecole Polytechnique, Palaiseau, France.

After defending her thesis she started to work at the "Materials and Devices for Electronics and Optoelectronics" Research Center as a research assistant focusing on numerical simulations and optimization problems, statistical analysis and modelling, *ab initio* modelling (SIESTA) of nanostructures, devices and materials, quantum transport in low dimensional nanostructures and photovoltaic devices. In the same period she had a part time teaching position at the Faculty of Physics, University of Bucharest being responsible of seminars regarding Introduction to parallel programming (C, MPI-C), Introduction to numerical computing (MIPS architecture, Verilog) and digital logic design. In 2015 she was a visiting researcher for 3 months at University of Oslo, Norway- Center for materials and nanotechnology (SMN).

In 2018 she joined the National Institute of Materials Physics in Magurele (Romania) as a scientific researcher III, starting her career in the surface science field. In her research she used a variety of surface science techniques, among others X-ray photoelectron spectroscopy (XPS), molecular beam epitaxy (MBE) and diffraction (LEED) for the characterization of solid surfaces, taking part in multiple experiments that took place at the Elettra Sincrotrone in Trieste, Italy. Dr. Adela Nicoalev is the coauthor of 14 publications and she has a H-Index of 7 according to Web of Science Core Collection, with a total of 100 citations, including 4 autociations.

## Publications in the last 5 years:

[1] I. Podolean, M. Dogaru, N.C. Guza, O.A. Petcuta, E.E. Jacobsen, **Adela Nicolaev**, B. Cojocaru, M. Tudorache, V.I. Parvulescu, Simona M. Coman, *Highly efficient Ru-based catalysts for lactic acid conversion to alanine*, *Nanomaterials* 14, 277 (2024) **Q2, IF= 5.3, AIS= 0.712**  
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[2] S.N. Hettiarachchi, J. Bowen, M. Kershaw, I.A. Baragau, Adela Nicolaev , S. Kellici, *Nanostructured Al<sub>2</sub>O<sub>3</sub>/Graphene Additive in Bio-Based Lubricant: A Novel Approach to Improve Engine Performance* , *Tribology International* 186(4):108619 (2023), **Q1, IF= 6.2 , AIS= 0.865, citation=1**, <https://www.sciencedirect.com/science/article/pii/S0301679X23004061>

[3] M. El. Fergani, N. Candu, I. Podolean, B. Cojocaru, Adeala Nicolaev, CM Teodorescu, M. Tudorache, VI Parvulescu, SM Coman, *Catalytic Hydrotreatment of Humins Waste over Bifunctional Pd-Based Zeolite Catalysts*, *Catalysts*, 12, 1202 (2022) **Q2, IF=3.9, AIS= 0.592, citation=1**, <https://www.mdpi.com/2073-4344/12/10/1202>

[4] KG Nguyen, IA Baragau, R. Gromicova, Adela Nicolaev, SAJ Thomson, A Rennie, NP Power, MT Sajjad, S Kellici, *Investigating the effect of N-doping on carbon quantum dots structure, optical properties and metal ion screening*, *Scientific Reports* 12, 13806 (2022) **Q2, IF=4.6, AIS=1.132, citations =19**, <https://www.nature.com/articles/s41598-022-16893-x>

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## Other publications :

[7] G.A. Nemnes, S. Iftimie, A. Palici, Adela Nicolaev, T.L. Mitran, A. Radu, S. Antohe, *Optimization of the structural configuration of ICBA/P3HT photovoltaic cells*, *Applied Surface Science* 424,264-268 (2017) **Q1, IF= 6.7 , AIS= 0.867, citations=8**

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[10] G.A. Nemnes and Adela Nicolaev, Transport in ferrocene single molecules for terahertz applications, Phys. Chem. Chem. Phys. 16, 18478 (2014) **Q3, IF= 3.3, AIS= 0.681, citations=6**

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## **ORAL PRESENTATION AT INTERNATIONAL CONFERENCES in the last 5 years :**

1. 36<sup>th</sup> European Conference on Surface Science, 26<sup>th</sup> August- 1<sup>st</sup> September 2023, Lodz, Poland, "Intercalation of carbon monoxide in sub-monolayer graphene on Pt(001)" Adela Nicolaev, Nicoleta G. Apostol, Ruxandra M. Costescu, D Lizzit, E Tosi, C Bucur, C A. Tache, A G. Lungu, A. Pena, P. Lacovig, S. Lizzit, C M. Teodorescu (**Oral**)
2. RomCat2022, The 13<sup>th</sup> International Symposium of Romanian Catalysis Society, June 22-24, 2022, Baile Govora, Romania, Intercalation of carbon monoxide in sub-monolayer graphene on Pt(001)-hex, Adela Nicolaev, Nicoleta G. Apostol, Ruxandra M. Costescu, Daniel Lizzit, Ezequiel Tosi, Cristina Bucur, Cristian A. Tache, Adrian G. Lungu, Adrian Pena, Paolo Lacovig, Silvano Lizzit, Cristian M. Teodorescu (**Oral**)
3. RomCat2019, The 12<sup>th</sup> International Symposium of Romanian Catalysis Society, June 5-7, 2019, Bucharest, Romania, Coupling ferroelectric PZT(001) surfaces with noble metals (Ag) for dissociation of adsorbed molecules (CO), Adela Nicolaev, Nicoleta G. Apostol, Ruxandra M. Costescu, Amelia E. Bocîrneă, Ioana A. Hristea, Cristina F. Chirilă, C. M. Teodorescu (**Oral**)

4. 4th edition of the International Workshop of Materials Physics (IWMP), May 28-29, 2019, Bucharest, Romania, Carbon monoxide adsorption, dissociation and oxidation on ferroelectric surfaces decorated with nanoparticles of noble metals, Adela Nicolaev, Marius A. Huşanu, Nicoleta G. Apostol, Ruxandra M. Costescu, Amelia E. Bocîrnea, Ioana A. Hristea, Daniel Lizzit, Cristina F. Chirilă, Lucian Trupina, Cristian M. Teodorescu (**Oral**)

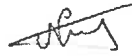
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Nume si prenume

Nicolaev Adela

Semnatura



Dr. **Elena Laura Abramiuc** is currently a scientific researcher III in the Surface and Interface Science Laboratory at the National Institute of Materials Physics in Măgurele, Ilfov, Romania. She began her scientific career by completing her Bachelor of Science (B.Sc.) at the Faculty of Applied Chemistry and Materials Science at the University Politehnica of Bucharest, focusing on Science and Engineering of Oxide Materials and Nanomaterials. Her undergraduate thesis, "Drying oxide materials in a microwave field," was overseen by Professor Zeno Ghizdavet in 2011. She pursued a Master of Science (M.Sc.) at the same institution. Here, she specialized in Pharmaceutical and Cosmetic Products, culminating in a thesis titled "Advanced methods of synthesis and characterization of magnetic nanoparticles for biomedical applications," under the guidance of Professor George Marton in 2013. She earned her Ph.D. in Physics at the Physics Faculty of University of Bucharest in 2019. Her doctoral thesis, supervised by Associate Professor Lucian Pintilie, delved into the "Study of charge accumulation and reactivity of surfaces exhibiting ferroelectric polarization." In 2012 she joined the National Institute of Materials Physics in Magurele (Romania) as a scientific research assistant, starting her career in the surface science field. In her research she used a variety of surface science techniques, among others X-ray photoelectron spectroscopy (XPS), electron microscopy (PEEM) and diffraction (LEED) for the characterization of solid surfaces. Dr. Elena Laura Abramiuc is the coauthor of **24 publications** (<https://scholar.google.com/citations?hl=ro&user=KqQD2KgAAAAJ>) and she has a **H-Index of 12** according to Web of Science Core Collection. In the period 2020-2022 she led the postdoctoral Project "Investigation by photoelectron spectro-microscopy of the interplay between surface and chemistry and polarization landscape of ferroelectric surfaces" (FERROSPECTROMIC), funded by the Romanian National Authority for Scientific Research, under contract no. PN-III-P1-1.1-PD-2019-0763 (246950 RON).

#### **Publications in the last 5 years:**

[1] L. E. Abramiuc, L.C. Tănase, M.J. Prieto, L. de S. Caldas, A. Tiwari, N.G. Apostol, M.A. Huşanu, C. F. Chirilă, L. Trupină, T. Schmidt, L. Pintilie, C.M. Teodorescu, *Surface charge dynamics on air-exposed ferroelectric Pb(Zr,Ti)O<sub>3</sub>(001) thin films*, **Nanoscale**, Vol. 15, p. 13062-13075, **2023 (Q1)**; **IF=6.7, AIS= 1.258**.

[2] Abramiuc LE, Tănase LC, Barinov A, Chirilă CF, Teodorescu CM, *Nanosopic correlations from curve fitting of photoelectron spectromicroscopy data cubes of lead zirconate titanate films*, **Results in Physics**, Vol. 36, p.105436, **2022 (Q2)**; **IF=5.3, AIS=0.654**. This article has **one** self-citation.



[3] Cojocaru B, Colbea C, Avram D, Istrate C, Abramiuc L, Tiseanu C, *Role of Ln type in the physical mechanisms of defect mediated luminescence of Li, Ln-SnO<sub>2</sub> nanoparticles*, **Journal of Materials Chemistry C**, Vol. 9, p. 148-157, 2021 (Q1); IF=6.4, AIS= 1.166. The total number of Citations is 3 (without self-citations).

[4] Neațu F, Abramiuc LE, Trandafir M, Negrea R, Florea M, Teodorescu CM, Neațu S, *Degenerated TiO<sub>2</sub> Semiconductor Modified with Ni and Zn as Efficient Photocatalysts for the Water Splitting Reaction*, **ChemCatChem**, Vol. 12, p. 4642-4651, 2020 (Q2); IF=4.5, AIS=0.893. The total number of citations is 12 (without self-citations).

### **Project:**

PN-III-P1-1.1-PD-2019-0763 “Investigation by photoelectron spectro-microscopy of the interplay between surface chemistry and polarization landscape of ferroelectric surfaces (FERROSPECTROMIC)”, Project Director, 2020-2022, 246950 RON.

### **All publications:**

[1] L. E. Abramiuc, L.C. Tănase, M.J. Prieto, L. de S. Caldas, A. Tiwari, N.G. Apostol, M.A. Hușanu, C. F. Chirilă, L. Trupină, T. Schmidt, L. Pintilie, C.M. Teodorescu, *Surface charge dynamics on air-exposed ferroelectric Pb(Zr,Ti)O<sub>3</sub>(001) thin films*, **Nanoscale**, Vol. 15, p. 13062-13075, 2023 (Q1).

[2] Abramiuc LE, Tănase LC, Barinov A, Chirilă CF, Teodorescu CM, *Nanoscope correlations from curve fitting of photoelectron spectromicroscopy data cubes of lead zirconate titanate films*, **Results in Physics**, Vol. 36, p.105436, 2022 (Q2). This article has one Citation.

[3] Cojocaru B, Colbea C, Avram D, Istrate C, Abramiuc L, Tiseanu C, *Role of Ln type in the physical mechanisms of defect mediated luminescence of Li, Ln-SnO<sub>2</sub> nanoparticles*, **Journal of Materials Chemistry C**, Vol. 9, p. 148-157, 2021 (Q1). The total number of Citations is 3.

[4] Neațu F, Abramiuc LE, Trandafir M, Negrea R, Florea M, Teodorescu CM, Neațu S, *Degenerated TiO<sub>2</sub> Semiconductor Modified with Ni and Zn as Efficient Photocatalysts for the Water Splitting Reaction*, **ChemCatChem**, Vol. 12, p. 4642-4651, 2020 (Q2).

[5] Bucur IC, Apostol NG, Stoflea LE, Tănase LC, Tache CA, Lungu GA, Costescu RM, Chirilă CF, Trupina L, Pintilie L, Teodorescu CM, *Room temperature ferromagnetism and its correlation to ferroelectricity of manganese embedded in lead zirco-titanate*, **Thin Solid Films**, Vol. 669, p. 440-449 (2019). The total number of citations is 2.

[6] Tănase LC, Abramiuc LE, Popescu DG, Trandafir A-M, Apostol NG, Bucur IC, Hrib L, Pintilie L, Pasuk I, Trupina L, Teodorescu CM, *Polarization Orientation in Lead Zirconate Titanate (001) Thin Films Driven by the Interface with the Substrate*, **Physical Review Applied**, Vol. 10, 2018 (Q1). The total number of citations is 32.

- [7] Bucur IC, Tănase LC, Stoflea EL, Lungu GA, Chirilă C, Trupina L, Apostol NG, Costescu RM, Negrea RF, Pintilie L, Teodorescu CM, *Triggering surface ferroelectric order in Pb(Zr,Ti)O<sub>3</sub> (001) by deposition of platinum*, **Applied Surface Science**, Vol. 432, p. 27, 2018 (Q1). The total number of citations is 6.
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- [9] Tănase LC, Lungu GA, Abramiuc EL, Bucur IC, Apostol NG, Costescu RM, Tache CA, Macovei D, Barinov A, Teodorescu CM, *Long-range magnetic interaction in Mnx Ge1-x : structural, spectromicroscopic and magnetic investigations*, **Journal of Materials Science**, Vol. 52, p.3309-3320, 2017 (Q2). The total number of citations is 2.
- [10] Tănase LC, Abramiuc EL, Teodorescu CM, *Photoelectron spectroscopic and microspectroscopic probes of ferroelectrics*, **AIP Conference Proceedings**, 1916, 030001 (2017). The total number of citations is 4.
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## **ORAL PRESENTATION AT INTERNATIONAL CONFERENCES:**

1. L. E. Abramiuc, L. N. G. Apostol, M. A. Huşanu, C. M. Teodorescu. Polarization charge dynamics on air-exposed ferroelectric Pb(Zr,Ti)O<sub>3</sub>(001) surfaces, 20th International Balkan Workshop on Applied Physics and Materials Science (IBWAP 2022).

2. L. E. Abramiuc, L. C. Tănase, N. G. Apostol, M. A. Huşanu, C. M. Teodorescu. Investigation by electron spectromicroscopy of the interplay between surface chemistry and polarization

landscape of ferroelectric surfaces 13th International Conference on Physics of Advanced Materials (ICPAM-13).

3. L. E. Abramiuc, L. C. Tănase, C. F. Chirilă, A. Barinov, C. M. Teodorescu. Lead photo-reduction from  $\text{Pb}(\text{Zr,Ti})\text{O}_3(001)$  investigated by photoelectron spectro-microscopy, The 12th International Symposium of the Romanian Catalysis Society, June 5–7, 2019, Bucharest.

4. L. E. Abramiuc, D. G. Popescu, M. A. Hușanu, L. C. Tănase, N. G. Apostol, C. A. Tache, I. C. Bucur, A. Barinov, J. Avila, C. F. Chirilă, L. Trupină, C. M. Teodorescu. Photoelectron spectromicroscopy: revealing the stability of ferroelectric surfaces with respect to irradiation and contamination, 4 th Edition of the International Workshop of Materials Physics, May 28–29, 2019, Măgurele.

5. D. G. Popescu, L. E. Abramiuc. Photoelectron spectromicroscopy of  $\text{Pb}(\text{Zr,Ti})\text{O}_3(001)$  and (111) surfaces, 1 st Edition of the International Workshop of Materials Physics, May 23–25, 2016, Măgurele.

6. L. E. Ștoflea, L. C. Tănase, N. G. Apostol, A. Barinov, C. M. Teodorescu. Photoelectron Spectroscopy of lead zirco-titanete (001) surfaces, The 8th International Conference On Advanced Materials, ROCAM 2015. July 7 – 10, 2015, Bucharest.

## Curriculum vitae

of George-Adrian LUNGU, Ph.D., member in research team

Dr. George-Adrian Lungu, physicist, born on December 3, 1978, earned his Ph.D. in Physics in 2014 from University of Bucharest with a thesis on magnetism of thin films. Presently, he is Researcher III in National Institute of Research and Development in Materials Physics (NIMP), [Laboratory of Surface and Interface Science](#), headed by Dr. habil. Cristian-Mihail Teodorescu, the leader of the research team enrolled as participant to the present Romanian Research Gala.



Dr. Lungu is also radiation protection officer (RPO) in the Laboratory of Spectrometry with positrons within the same institution. He is involved in various projects within the institution. Dr. Lungu is skilled in spectroscopy of Auger electron and X-ray photoelectron emission (AES/XPS), X-ray absorption fine structure (XAFS), and deposition of thin films by molecular beam epitaxy (MBE), as well as in magnetic characterization of magnetic thin films. He was involved in various research projects during the last five years, most headed by the team leader or other colleagues in the host institute.

He was also involved in experiments of spin resolved photoelectron spectroscopy (SRPES), as well as XAFS, developed at two different synchrotron radiation facilities in Europe, Elettra Sincrotrone Trieste, Italy, and Suisse Light Source (SLS) within Paul Scherrer Institute (PSI), Zurich, Switzerland, during this period. Two of the below enlisted published papers are related to the experiments developed there. For entire period of research activity (2002-present), h-index is 12.

### **Publications within last 5 years of George-Adrian Lungu (after January 31, 2019):**

1. N.G. Apostol, D. Lizzit, G.A. Lungu, P. Lacovig, C.F. Chirila, L. Pintilie, S. Lizzit, C.M. Teodorescu, *Resistance hysteresis correlated with synchrotron radiation surface studies in atomic  $sp^2$  layers of carbon synthesized on ferroelectric (001) lead zirconate titanate in an ultrahigh vacuum*, RSC Advances **10**(3), 1522-1534 (2020).  
JIF (2022): 3.9 (Q2 quartile). AIS (2022): 0.570.  
4 citations, no self-citation.
2. N.G. Apostol, I.C. Bucur, G.A. Lungu, C.A. Tache, C.M. Teodorescu, *CO adsorption and oxidation at room temperature on graphene synthesized on atomically clean Pt(001)*, Catalysis Today **366**, 155-163 (2021).  
JIF (2022): 5.3 (Q1 quartile). AIS (2022): 0.837.  
3 citations, no self-citation.

3. T. Tite, A.C. Popa, B.W. Stuart, H.R. Fernandes, I.M. Chirica, G.A. Lungu, D. Macovei, C. Bartha, L. Albulescu, C. Tanase, S. Nita, N. Rusu, D.M. Grant, J.M.F. Ferreira, G.E. Stan, *Independent and complementary bio-functional effects of CuO and Ga<sub>2</sub>O<sub>3</sub> incorporated as therapeutic agents in silica- and phosphate- based bioactive glasses*, Journal of Materiomics **8**(4), 993-905 (2022).  
JIF (2022): 9.4 (Q1 quartile). AIS (2022): 1.529.  
6 citations, no self-citation.

Măgurele, January 30, 2024



Complete published papers list – Dr. George-Adrian Lungu

1. C.M. Teodorescu, D. Macovei, A. Lungu, *J Structural and magnetic investigations of nickel clusters in C60 matrices*, J. Optoelectr. Adv. Mater. **6**(4), 1275-1285 (2004). JIF (2022) = 0.5 (Q4), AIS (2022) = 0.053.
2. G.L. Bayatian, S. Chatrchyan, (...), G.A. Lungu, (...), B.S. Yuldashev, *CMS physics technical design report, volume II: Physics performance*, J. Phys. G-Nucl. Part. Phys. **34**(6), 995-1579 (2007). JIF (2022) = 3.5 (Q2), AIS (2022) = 1.023.
3. S.Chatrchyan, G. Hmayakyan, (...) G.A. Lungu, (...), A. Zabi, *CMS physics technical design report: Addendum on high density QCD with heavy ions*, J. Phys. G-Nucl. Part. Phys. **34**(11), 2307-2455 (2007). JIF (2022) = 3.5 (Q2), AIS (2022) = 1.023.
4. S. Chatrchyan, G. Hmayakyan, (...), G.A. Lungu, (...), G. Onengut, *The CMS experiment at the CERN LHC*, J. Instrum. **3**(8), S08004:1-334 (2007). JIF (2022) = 1.3 (Q4), AIS (2022) = 0.438.
5. C.M. Teodorescu, G.A. Lungu, *Band ferromagnetism in systems of variable dimensionality*, J. Optoelectr. Adv. Mater. **10**(11), 3058-3068 (2008). JIF (2022) = 0.5 (Q4), AIS (2022) = 0.053.
6. G.A. Lungu, C.M. Teodorescu, *Band ferromagnetism in systems of variable dimensionality II: the two-dimensional finite-temperature case*, J. Optoelectr. Adv. Mater. **11**(4), 369-379 (2009). JIF (2022) = 0.5 (Q4), AIS (2022) = 0.053.
7. W. Adam, T. Bergauer, (...), G.A. Lungu, (...), K.V. Tsang, *Stand-alone cosmic muon reconstruction before installation of the CMS silicon strip tracker*, J. Instrum. **4**(5), P05004:1-36 (2009). JIF (2022) = 1.3 (Q4), AIS (2022) = 0.438.
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10. G.A. Lungu, D. Macovei, C.M. Teodorescu, *Preparation and characterization of iron oxides embedded in fullerite matrices*, Digest J. Nanomater. Biostruct. **5**(1), 85-95 (2010). JIF (2022) = 0.9 (Q4), AIS (2022) = 0.097.
11. P. Palade, G.A. Lungu, A.M. Husanu, *Thermodynamic destabilization of Li-N-H system by Si addition*, J. Alloy. Compd. **505**(1), 343-347 (2010). JIF (2022) = 6.2 (Q1), AIS (2022) = 0.738.
12. N.G. Gheorghe, G.A. Lungu, R.M. Costescu, D.G. Popescu, C.M. Teodorescu, *Enhanced contamination of Si(001) when analyzed with AES with respect to XPS*, Optoelectron. Adv. Mater. - Rapid Commun. **5**(5-6), 499-504 (2011). JIF (2022) = 0.5 (Q4), AIS (2022) = 0.045.
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14. R.M. Costescu, G.A. Lungu, G. Socol, N.G. Gheorghe, D. Macovei, C.C. Negrila, C. Logofatu, M.A. Husanu, D.G. Popescu, C.A. Tache, *Atomic structure and magnetism of PLD deposited TiO<sub>2</sub>:Fe*, C.M. Teodorescu, Digest J. Nanomater. Biostruct. **7**(1), 73-78 (2012). JIF (2022) = 0.9 (Q4), AIS (2022) = 0.097.
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  25. N.C. Popa, G.A. Lungu, *Dependence of the strain diffraction line broadening on (hkl) and sample direction in textured polycrystals*, J. Appl. Crystallogr. **46**(2), 391-395 (2013). JIF (2022) = 3.304 (Q2), AIS (2022) = 1.321.
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  29. N.G. Apostol, L.E. Stoflea, G.A. Lungu, C.A. Tache, D.G. Popescu, L. Pintilie, C.M. Teodorescu, *Band bending at free Pb(Zr,Ti)O<sub>3</sub> surfaces analyzed by X-ray photoelectron spectroscopy*, Mater. Sci. Eng. B **178**, 1317–1322 (2013). JIF (2022) = 3.6 (Q2), AIS (2022) = 0.530.
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42. *Resistance hysteresis in atomic layers of carbon synthesized on ferroelectric (001) lead zirconate titanate in ultrahigh vacuum*, N.G. Apostol, D. Lizzit, G.A. Lungu, P. Lacovig, C.F. Chirila, L. Pintilie, S. Lizzit, C.M. Teodorescu, RSC Adv. **10**(3), 1522-1534 (2020). JIF (2022): 3.9 (Q2). AIS (2022) = 0.570.
43. N.G. Apostol, I.C. Bucur, G.A. Lungu, C.A. Tache, C.M. Teodorescu, *CO adsorption and oxidation at room temperature on graphene synthesized on atomically clean Pt(001)*, Catal. Today **366**, 155-163 (2021). JIF (2022) = 5.3 (Q1), AIS (2022) = 0.837.
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*Independent and complementary bio-functional effects of CuO and Ga<sub>2</sub>O<sub>3</sub> incorporated as therapeutic agents in silica- and phosphate- based bioactive glasses*, J. Materiomics **8**(4), 893-905 (2022). JIF (2022) = 9.4 (Q3), AIS (2022) = 1.529.

Book chapters:

1. N.G. Gheorghe, M.A. Husanu, G.A. Lungu, D. Macovei, V. Kuncser, R.M. Costescu, D.G. Popescu, C.M. Teodorescu, *Growth and characterization of ultrathin Fe magnetic layers deposited on atomically clean Si(001) by molecular beam epitaxy*, **Nanomaterials and nanostructures for various applications**, G. Brezeanu, H. Iovu, C. Cobianu, D. Dascălu (Eds.), Ed. Academiei Române, Bucharest, pp. 225-244 (2012), ISBN: 978-973-27-2169-8.
2. G.A. Lungu, N.G. Apostol, C.M. Teodorescu, *Basic concepts in ferromagnetism of diluted magnetic semiconductors. The case of manganese embedded in Ge(001)*, **Nanomagnetism**, J.M. Gonzalez Estevez (Ed.), OneCentralPress, Manchester, pp. 74–110 (2014), ISBN: 978-1-910086-05-6.

Măgurele, January 31, 2024





**CSIII Dr Ioan-Alexandru Baragau**

Age: 32, Nationality: Romanian, Gender: Male

Contact: -

Dr Ioan-Alexandru Baragau has a Degree in Chemistry (July 2014, Faculty of Chemistry, University of Bucharest), a Master of Science Degree in Chemistry of Advanced Materials (July 2016, Faculty of Chemistry, University of Bucharest), and a doctorate (PhD) in Chemical Engineering (November 2021, School of Engineering, London South Bank University) with his research focuses on the green synthesis and characterisation of nanomaterials (CQDs, NCQDs, TiO<sub>2</sub>, rGO) and nanocomposite ([TiO<sub>2</sub>-NCQDs], [TiO<sub>2</sub>-rGO], and [TiO<sub>2</sub>-NCQDs-rGO]) for environmental applications (ion-nanosensing, photocatalysis, and wastewater treatment); thesis title: *New generation of continuous hydrothermal flow synthesis materials for environmental applications*. During his PhD project, research collaboration and activities, Dr Ioan-Alexandru Baragau has developed a new research direction in the continuous hydrothermal flow synthesis (CHFS) field by expanding the material portfolio to carbon quantum dots, reduced graphene oxide via the formic acid procedure and carbonaceous nanocomposites with TiO<sub>2</sub> aka visible light active hybrid photocatalysts.

The first CQDs-related research article<sup>1</sup> was published in 2020 (as a first author) in the Journal of Material Chemistry A (AIS: 2.17, IF: 12.732, Q1 (red zone)) on nitrogen-doped carbon quantum dots synthesis was the first time ever report of CQDs synthesis *via* continuous hydrothermal flow synthesis (starting from citric acid as carbon source and ammonia as nitrogen source), and this study was selected and included in the 2021 Journal of Materials Chemistry A and Materials Advances Editor's choice web collection: "*Recent advances in hydrothermal materials synthesis*"<sup>2</sup>. The as-synthesised NCQDs were successfully tested as nanosensors for the highly toxic and carcinogenic chromate anions (Cr(VI)) with a detection limit of 0.365 ppm and high selectivity over other cations and anions, proving that the carbon quantum dots made *via* CHFS can be used for carcinogenic in real-time ion-sensing applications. According to Web of Science, this article is the highest cited paper of Dr Ioan-Alexandru Baragau, with 44 citations (without self-citations), confirming the progress in the CQDs field brought by this study. In the following years, the CHFS synthetic explorations were expanded to glucose as carbon source, resulting in three articles that reported the synthesis of CQDs<sup>3</sup> (main author, ACS Sustainable Chemistry & Engineering, AIS: 1.364, IF: 9.224, Q1 (red zone)), S-CQDs<sup>4</sup> (main author, Chemical Engineering Journal, AIS: 1.758, IF: 16.744, Q1 (red zone)) and NCQDs<sup>5</sup> (co-author, Scientific Reports, AIS: 1.129, IF: 4.6, Q2 (yellow zone)), proving the tunability of the CHFS method for carbon quantum dots synthesis via bottom-up approach. The CQDs, made from glucose only, presented a dual ion-sensing ability in the detection of chromate anion (Cr(VI)) and Fe (II). In contrast, NCQDs, made from glucose and ammonia, presented a high selectivity for Cr(VI) only. Since 2020, these four articles have generated 137 citations (without self-citation), averaging 34.25 per article. All the developed synthetic technologies and applications were incorporated into a patent<sup>6</sup>. Also, during his PhD research, he succeeded in creating a new, fast, cheap, innovative synthetic method for reduced graphene oxide production; part of the study was reported in his thesis (title: *New Generation of Continuous Hydrothermal Flow Synthesis Materials for Environmental Applications*), and more exploration and optimisations are ongoing, few more research articles will be published soon. These materials were successfully integrated into high-pressure membrane (HPM) prototypes for wastewater treatment and tested for a variety of pollutants

such as metal ions (Fe(II), Fe(III), Cr(VI)), dyes (methylene blue and rhodamine B) and biological samples (cytochrome C). Furthermore, he used all progress and results achieved in the CHFS field for CQDs and rGO to engineer new visible-light, efficient, hybrid photocatalysts by in-situ single-step CHFS generating multiphase nano-TiO<sub>2</sub>-carbonaceous composites: [TiO<sub>2</sub>-NCQDs], [TiO<sub>2</sub>-rGO], and [TiO<sub>2</sub>-NCQDs-rGO]. The study<sup>7</sup> was published in 2023 in the *Journal of Material Chemistry A* (AIS:2.108 IF:11.9, Q1 (red zone), awarded with an internal cover from the journal editor and recently the article has been featured in the *Journal of Materials Chemistry A 2023 Most Popular Articles collection*, this collection highlights some of the most cited, most downloaded or most shared articles and reviews from 2023 published in the journal.

Dr Ioan-Alexandru Baragau has a h-index=8, and his reported experimental work and results received significant attention from the scientific community; all ten papers were cited 242 times by 220 articles. Below, you can find a selection list of some of the most relevant citations of the first author's published studies, referring to the nanomaterials and nanocomposites synthetic methodology, properties or their applications, as follows:

I) Ioan-Alexandru Baragau, Nicholas P Power, David J Morgan, Tobias Heil, Richard Alvarez Lobo, Christopher Simon Roberts, Maria-Madgalena Titirici, Steven Dunn, Suela Kellici, *Continuous hydrothermal flow synthesis of blue-luminescent, excitation-independent nitrogen-doped carbon quantum dots as nanosensors*, *Journal of Materials Chemistry A*, 8, 3270-3279 (2020), AIS: 2.108, Q1 (red zone):

1) Y.X. Pang, X. Li, X. Zhang, J.X. Yeoh, C. Wong, S. Manickam, Y. Yan, T. Wu, C.H. Pang, *The synthesis of carbon-based quantum dots: A supercritical fluid approach and perspective*, *Materials Today Physics*, 27, 100752(2020), Q1 (red zone).

2) C. Zhao, X Wang, L. Yu, L. Wu, X. Hao, Q. Liu, L. Lin, Z. Huang, Z. Ruan, S. Weng, A. Liu, X. Lin, *Quaternized carbon quantum dots with broad-spectrum antibacterial activity for the treatment of wounds infected with mixed bacteria*, *Acta Biomaterialia*, 138, 528-544 (2022), Q1 (red zone).

3) S. D. Dsouza, M. Buerkle, P. Brunet, C. Maddi, D. B. Padmanaban, A. Morelli, A. F. Payam, P. Maguire, D. Mariotti, V. Svrcek, *The importance of surface states in N-doped carbon quantum dots*, *Carbon*, 183, 1-11(2021), Q1 (red zone).

4) A. Henrique da Silva Júnior, D. L. P. Macuvele, H. G. Riella, C. Soares, N. Padoin, *Are carbon dots effective for ion sensing and antiviral applications? A state-of-the-art description from synthesis methods to cost evaluation*, *Journal of Materials Research and Technology*, 12, 688-716 (2021), Q1 (red zone).

5) S. Mandal, P. Das, *Are carbon dots worth the tremendous attention it is getting: Challenges and opportunities*, *Applied Materials Today*, 26, 101331(2022), Q1 (red zone).

II) Ioan-Alexandru Baragau, Nicholas P Power, David J Morgan, Richard A Lobo, Christopher S Roberts, Maria-Magdalena Titirici, Vesna Middelkoop, Adriana Diaz, Steven Dunn, Suela Kellici, *Efficient continuous hydrothermal flow synthesis of carbon quantum dots from a targeted biomass precursor for on-off metal ions nanosensing*, *ACS Sustainable Chemistry & Engineering*, 9, 2559-2569(2021), AIS: 1.364, Q1 (red zone):

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2) Ying Feng, Junjie Jiang, Yaxuan Xu, Shufei Wang, Wei An, Qingshuo Chai, Umme Hani Prova, Chunxia Wang, Guoyong Huang, *Biomass-derived diverse carbon nanostructure for electrocatalysis, energy conversion and storage*, *Carbon*, 211, 118105 (2023), Q1 (red zone).

3) Gwajeong Jeong, Chan Ho Park, Dongchan Yi, Hyunseung Yang, *Green synthesis of carbon dots from spent coffee grounds via ball-milling: Application in fluorescent chemosensors*, *Journal of Cleaner Production*, 392, 136250 (2023), Q1 (red zone).

4) Siwei Yang, Yongqiang Li, Liangfeng Chen, Hang Wang, Liuyang Shang, Peng He, Hui Dong, Gang Wang, Guqiao Ding, *Fabrication of Carbon-Based Quantum Dots via a "Bottom-Up" Approach: Topology, Chirality, and Free Radical Processes in "Building Blocks"*, *Small*, 19, 31 (2023), Q1 (red zone).

5) Y.X. Pang, X. Li, X. Zhang, J.X. Yeoh, C. Wong, S. Manickam, Y. Yan, T. Wu, C.H. Pang, *The synthesis of carbon-based quantum dots: A supercritical fluid approach and perspective*, *Materials Today Physics* 27, 100752 (2022), Q1 (red zone).

6) Edis Glogic, Marie Claverie, Md Jubayed, Valentina Musumeci, Christel Carême, François Martin, Guido Sonnemann, Cyril Aymonier, *Greening Pathways for Synthetic Talc Production Based on the Supercritical Hydrothermal Flow Process*, *ACS Sustainable Chemistry and Engineering*, 9, 49, 16597–16605 (2021), Q1 (red zone).

III) Ioan-Alexandru Baragau, Zhen Lu, Nicholas P Power, David J Morgan, James Bowen, Pedro Diaz, Suela Kellici, *Continuous hydrothermal flow synthesis of S-functionalised carbon quantum dots for enhanced oil recovery*, *Chemical Engineering Journal*, 405, 126631(2021), AIS: 1.758, Q1 (red zone):

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4) Wanmei Lin, Yifan Zhang, Jihong Huang, Zhonghong Li, *Fluorescence and pectinase double-triggered chitosan/pectin/calcium propionate/curcumin- $\beta$ -cyclodextrin complex film for pork freshness monitoring and maintenance*, *International Journal of Biological Macromolecules* 257, 1, 128603 (2024), Q1 (red zone).

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*environmental applications: An overview*, Applied Surface Science Advances, 18, 100487 (2023), Q1 (red zone).

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3) Mithun Prakash Ravikumar, Toan-Anh Quach, Bharagav Urupalli, Sanath Kumar, Yen-Pei Fu, Mamatha Kumari Murikinati, Shankar Muthukonda Venkatakrishnan, Trong-On Do, and Sakar Mohan, *Phase Engineering of Titanium Oxynitride System and Its Solar Light-Driven Photocatalytic Dye Degradation, H<sub>2</sub> Generation, and N<sub>2</sub> Fixation Properties*, ACS Sustainable Chemistry & Engineering, 11, 42, 15192-15206 (2023), Q1 (red zone).

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2. Unterlass, M. M. Journal of Materials Chemistry A and Materials Advances Editor's choice web collection: 'Recent advances in hydrothermal materials synthesis'. *J. Mater. Chem. A* **9**, 661–662 (2021).

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7. Baragau, I.-A. *et al.* Outstanding visible light photocatalysis using nano-TiO<sub>2</sub> hybrids with nitrogen-doped carbon quantum dots and/or reduced graphene oxide. *J. Mater. Chem. A* **11**, 9791–9806 (2023).

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1) V. Middelkoop, T. Slater, M. Florea, F. Neațu, S. Danaci, V. Onyenkeadi, K. Boonen, B. Saha, I.-A. Baragau, S. Kellici, *Next frontiers in cleaner synthesis: 3D printed graphene-supported CeZrLa mixed-oxide nanocatalyst for CO<sub>2</sub> utilisation and direct propylene carbonate production*, Journal of Cleaner Production, 214, 606-614 (2019). DOI: <https://doi.org/10.1016/j.jclepro.2018.12.274> (Q1; IF=11.07; AIS=0.969; Citations: 45 / 41 (without self-citations)).

2) I.-A. Baragau, N. P. Power, D. J. Morgan, T. Heil, R. A. Lobo, C. S. Roberts, M.-M. Titirici, S. Dunn, S. Kellici, *Continuous Hydrothermal Flow Synthesis of Blue-Luminescent, Excitation-Independent N-doped Carbon Quantum Dots as Nanosensors*, Journal of Materials Chemistry A, 8, 3270–3279 (2020). DOI: <https://doi.org/10.1039/C9TA11781D> (Q1; IF=14.51; AIS=2.171; Citations: 49/ 44 (without self-citations)).

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<https://doi.org/10.1016/j.cej.2020.126631> (Q1; IF=16.74; AIS=1.758; Citations: 41/ 39 (without self-citations)).

4) I.-A. Baragau, N. P. Power, D. J. Morgan, R. A. Lobo, C.S. Roberts, M.-M. Titirici, V. Middelkoop, A. Diaz, S. Dunn, S. Kellici, *Efficient Continuous Hydrothermal Flow Synthesis of Carbon Quantum Dots from a Targeted Biomass Precursor for On-Off Metal Ions Nanosensing*, ACS Sustainable Chemistry & Engineering, 9, 2559–2569 (2021). DOI: <https://doi.org/10.1021/acssuschemeng.0c08594> (Q1; IF=9.22; AIS=1.364; Citations: 37 / 35 (without self-citations)).

5) C. Jacquot, V. Middelkoop, A. Köckritz, A. Pohar, R. Bienert, S. Kellici, I.-A. Baragau, B. Venezia, A. Gavriilidis, B. Likozar, A.M. Beale, 3D printed catalytic reactors for aerobic selective oxidation of benzyl alcohol into benzaldehyde in continuous multiphase flow, Sustainable Materials and Technologies, 30, e00239, 1-12, (2021). <https://doi.org/10.1016/j.susmat.2021.e00329> (Q1; IF=10.68; AIS=1.483; Citations: 9 / 9 (without self-citations)).

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9) S. J. Hettiarachchi, J. Bowen, M. Kershaw, I.-A. Baragau, A. Nicolaev, S. Kellici, *Nanostructured Al<sub>2</sub>O<sub>3</sub>/graphene additive in bio-based lubricant: A novel approach to improve engine performance*, Tribology International, 186, 108619 (2023). DOI: <https://doi.org/10.1016/j.triboint.2023.108619> (Q1; IF=6.2; AIS=0.865; Citations: 1 / 1 (without self-citations))

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1) Ioan-Alexandru Baragau and Suela Kellici, Biomass-derived carbon quantum dots synthesised via continuous hydrothermal flow process, World Intellectual Property Organization, 2021, WO/2021/130501A1 (PCT/GB2020/053368).



## Articles and patents list of Dr Ioan-Alexandru Baragau

### Articles:

1) Suela Kellici, John Acord, Katherine E. Moore, Nicholas P. Power, Vesna Middelkoop, David J. Morgan, Tobias Heil, Paolo Coppo, **Ioan-Alexandru Baragau** and Colin L. Raston, *Continuous hydrothermal flow synthesis of graphene quantum dots*, Reaction Chemistry & Engineering, 2018, 3, 949-958. DOI: <https://doi.org/10.1039/C8RE00158H>

2) Vesna Middelkoop, Thomas Slater, Mihaela Florea, Florentina Neațu, Simge Danaci, Victor Onyenkeadi, Katrien Boonen, Basudeb Saha, **Ioan-Alexandru Baragau**, Suela Kellici, *Next frontiers in cleaner synthesis: 3D printed graphene-supported CeZrLa mixed-oxide nanocatalyst for CO<sub>2</sub> utilisation and direct propylene carbonate production*, Journal of Cleaner Production, 214, 2019, 606-614. DOI: <https://doi.org/10.1016/j.jclepro.2018.12.274>

3) **Ioan-Alexandru Baragau**, Nicholas P Power, David John Morgan, Tobias Heil, Richard Alvares Lobo, Christopher S Roberts, Magdalena Titirici, Steve Dunn and Suela Kellici, *Continuous Hydrothermal Flow Synthesis of Blue-Luminescent, Excitation-Independent N-doped Carbon Quantum Dots as Nanosensors*, Journal of Materials Chemistry A, 2020, 8, 3270-3279, DOI: <https://doi.org/10.1039/C9TA11781D>

4) **Ioan-Alexandru Baragau**, Zen Lu, Nicholas P. Power, David J. Morgan, James Bowen, Pedro Diaz, Suela Kellici, *Continuous Hydrothermal Flow Synthesis of S-Functionalised Carbon Quantum Dots for Enhanced Oil Recovery*, Chemical Engineering Journal, 2020, 405, 126631. DOI: <https://doi.org/10.1016/j.cej.2020.126631>

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6) C. Jacquot, V. Middelkoop, A. Köckritz, A. Pohar, R. Bienert, S. Kellici, **Ioan-Alexandru Băragău**, B. Venezia, A. Gavriilidis, B. Likožar, A.M. Beale, 3D printed catalytic reactors for aerobic selective oxidation of benzyl alcohol into benzaldehyde in continuous multiphase flow, Sustainable Materials and Technologies, 2021, 30, e00239, 1-12, DOI: <https://doi.org/10.1016/j.susmat.2021.e00329>

7) Uthman Alli, Kieran McCarthy, **Ioan-Alexandru Baragau**, Nicholas P Power, David J Morgan, Steven Dunn, Seamus Killian, Tadhg Kennedy, Suela Kellici, *In-situ continuous hydrothermal synthesis of TiO<sub>2</sub> nanoparticles on conductive N-doped MXene nanosheets for binder-free Li-ion battery anodes*, Chemical Engineering Journal, 2021, 430, 132976, DOI: <https://doi.org/10.1016/j.cej.2021.132976>.

8) Kiem G. Nguyen, **Ioan-Alexandru Baragau**, Radka Gromicova, Adela Nicolaev, Stuart AJ Thomson, Alistair Rennie, Nicholas P Power, Muhammad T. Sajjad, Suela Kellici, *Investigating the effect of N-doping on carbon quantum dots structure, optical properties and metal ion screening*, Scientific Reports, 2022, 12, 1, 13806, DOI: <https://doi.org/10.1038/s41598-022-16893-x>.



9) **Ioan-Alexandru Baragau**, John Buckeridge, Kiem G Nguyen, Tobias Heil, Muhammad Tariq Sajjad, Stuart AJ Thomson, Alistair Rennie, David J Morgan, Nicholas P Power, Sabina Alexandra Nicolae, Maria-Magdalena Titirici, Steve Dunn, Suela Kellici, *Outstanding visible light photocatalysis using nano-TiO<sub>2</sub> hybrids with nitrogen-doped carbon quantum dots and/or reduced graphene oxide*, Journal of Materials Chemistry A, 2023, 11, 18, 9791-9806 DOI: <https://doi.org/10.1039/D2TA09586F>

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#### **Patents:**

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## Curriculum Vitae

### COTÎRLAN- SIMIONIUC COSTEL

**Born:** May 21, 1966, male; **Organisation providing education and training:** University of Bucharest, Faculty of Physics, September 1985 - June 1990; **Senior Researcher III**, from 2005 in National Institute of Materials Physics, Atomistilor 405A, 077125 Magurele-Ilfov, Romania, phone: 0727250029; **Principal subjects/occupational skills covered:** surface science (angle-resolved evanescent-wave cavity ring-down spectroscopy, X-ray photoelectron spectroscopy), optoelectronics: solid-state lasers, tunable dye lasers, photodetectors, optics, IR imaging, imaging polarimetry, metasurfaces; **Technical skills and competences:** specific skills in laser spectroscopy and optical characterization of surfaces and interfaces; **PhD Thesis:** "Characterization studies by structural and optical methods of surfaces and interfaces", 2011, University of Bucharest, **Publication list:** <http://www.researcherid.com/rid/B-4748-2012>; H-Index: 6, 25 publications in Web of Science, 169 Sum of Times Cited, 156 Citing Articles, 6 OSIM patents and 7 OSIM application patent requests; **Book:** "Structural and optical methods for the study of surfaces and interfaces" Mihail Florin Lazarescu, Adrian Stefan Manea, Constantin Logofatu, Rodica Ghita, Costel Cotirlan-Simioniuc, Ed. Electra, 144 p, 2009; **Chapters of book:** "Study of SiO<sub>2</sub>/Si Interface by Surface Techniques" in book: "Crystalline Silicon - Properties and Uses", Editor: Sukumar Basu, Ed. Intech Open, ISBN 978-953-307-587-7, July 2011, and "Surface Modification of III-V Compounds Substrates for Processing Technology" in book: "Nanoscaled Films and Layers", Editor: László Nánai, University of Szeged, Hungary, Ed. IntechOpen, ISBN 978-953-51-3143-4, doi : [10.5772/67916](https://doi.org/10.5772/67916), May 24, 2017; **Marketing:** "The development of photovoltaic cells at INCDFM - past, present and future"- Dr. Costel Cotirlan-Simioniuc, Market Watch no. 249 (Nov. 2022), page 22; **Theme proposal:** „Transparent optoelectronic components based on metasurfaces” in **Nucleu programme 2023-2025:** PN23-010202 „Materials, structures and methods with application potential in bioeconomics and health domains”, **Reviewer** for PTE-2019, **International project proposals:** M-ERA.NET 2019: „Interchangeable metasurfaces for immunofluorescent sensor and spectroscopical systems”; M-ERA.NET 2020: „Active metasurfaces for imaging and spectroscopical systems”; M-ERA.NET 2022: „Thin solar cells integrating metasurfaces for index modulation”.

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1. C. Cotirlan-Simioniuc, S. A. Manea, C. Logofatu, *Structură de superlentilă electrooptică pentru imagistica cu rezoluție sub limita de difracție / Structure of an electro-optical lens for imaging below the diffraction limit*, OSIM Patent No. 131292 / 26.02.2021.
2. C. Cotirlan-Simioniuc, *Ochelari cu metasuprafete plasmonice / Glasses with plasmonic metasurfaces*, OSIM Patent No. 132835 / 30.06.2022.
3. C. Cotirlan-Simioniuc, A. Rizea, D. V. Ursu, *Dispozitiv optoelectronic cu metasuprafata configurabila electric pentru controlul polarizarii luminii / Optoelectronic device with electrically configurable metasurface for control of the light polarization*, OSIM awarding decision No. 44/82 from 30.05.2022, RO 132167 B1 published in BOPI No. 10/2022.

Other 4 patent applications during the same period.

# Curriculum Vitae

**Dr. Eng. Cristian Alexandru Tache**

*Technical Development Engineer 3*

Date of Birth: 02/08/1988

E-mail: / \_\_\_\_\_

## Education

In 2013 I've graduated the Master School in Nano and Electromagnetic Microsystems at Politehnica University of Bucharest by studying the influence of light on the magnetic properties of the samples obtained by diffusion in germanium manganese.

In 2017, I have graduated the PhD School of Nanotechnology from Trieste University, Italy, where I was focused in a new study of graphene growth on different substrates, especially on those where CVD method is precluded, by using a new e-beam Carbon evaporator. This study was one of the first precursor of a new era of 2D growth material using an e-beam evaporator, by lowering the substrate temperature needed in graphene formation.

## Work experience

I've started my career in the National Institute of Material Physics since 2011, as Electrical Engineer, where I've acquired an extensive expertise in a range of experimental techniques for surface analysis, including Molecular Beam Epitaxy, X-ray Photoelectron Spectroscopy-XPS, Low Electron Diffraction-LEED, Scanning Tunneling Microscopy-STM, Magnetic Optic Kerr Effect- MOKE. I've gained familiarity with Ultra High Vacuum Technologies and with assembling and operating laboratory equipment.

In 2013, I was directly involved in the logistical effort of relocation at Elettra Synchrotron of Trieste, Italy of the Romanian CoSmos facility, which later becomes one of the National Interest Laboratory equipments.

Since 2018, I was invested as Technical Development Engineer of the group. Therefore, in the past 5 years I was directly involved in developing and construction of different laboratory systems, like:

- Design and assemble a new Carbon Evaporator, based on the electronic beam principle. The innovation of this new evaporator was the very simple cooling system based only on a copper tube around the electrical circuit, which naturally transfer the heat between the hot and cold edges of the tube.
- Construction of a new radiological PAES facility which is based on positron spectroscopy emitted directly from a Na<sub>22</sub> source.
- Assembling of a new MBE facility with new Knudsen-cell evaporators.

- Design and assemble of a new mobile gas line equipment which can be transferred on different laboratory facilities.

In present, I am also a member of the operation team for the RENAR accredited laboratory LIMSAE which is specialized in XPS measurements.

## Articles

1. *CO adsorption and oxidation at room temperature on graphene synthesized on atomically clean Pt(001)*, Apostol NG ; Bucur IC; **Tache CA**; Teodorescu CM, *Catalysis Today* **366**, p. 155-163 (2021), JIF:5.3; AIS:0.837; Citation:3
2. *Room temperature ferromagnetism and its correlation to ferroelectricity of manganese embedded in lead zirco-titanate*, Bucur, IC , Apostol, NG ; Abramiuc, LE ; Tanase LC ; **Tache CA** ; Lungu GA ; Costescu RM ; Chirila CF ; Trupina L; Pintilie L; Teodorescu CM, *Thin Solid Films* **669**, p. 440-449 (2019), JIF:2.1; AIS:0.316; Citation:2



1. *CO adsorption and oxidation at room temperature on graphene synthesized on atomically clean Pt(001)*, Apostol NG ; Bucur IC; **Tache CA**;Teodorescu CM, *Catalysis Today* **366**, p. 155-163 (2021),
2. *Room temperature ferromagnetism and its correlation to ferroelectricity of manganese embedded in lead zirco-titanate*, Bucur, IC , Apostol, NG ; Abramiuc, LE ; Tanase LC ; **Tache CA** ; Lungu GA ; Costescu RM ; Chirila CF ; Trupina L; Pintilie L; Teodorescu CM, *Thin Solid Films* **669**, p. 440-449 (2019).
3. *Graphene growth by molecular beam epitaxy: an interplay between desorption, diffusion and intercalation of elemental C species on islands*, Presel F; Tetlow H; Bignardi L; Lacovig P; **Tache A**; Lizzit ; Kantorovich L; Baraldi A, *Nanoscale* **10**, p. 7396-7406, (2018).
4. *Spectroscopic Fingerprints of Carbon Monomers and Dimers on Ir(111): Experiment and Theory*, Presel F;**Tache CA**; Tetlow H; Curcio D;Lacovig, P; Kantorovich L; Lizzit, S; Baraldi A, *Journal of Phys. Chem. C* **121**, p. 11335-11345, (2017).
5. *Long-range magnetic interaction in  $Mn_xGe_{1-x}$ : structural, spectromicroscopic and magnetic investigations*,Tanase LC; Lungu GA;Abramiuc LE; Bucur IC; Apostol NG; Costescu RM; **Tache CA**; Macovei D;Barinov A;Teodorescu, CM, *Journal of Material Science* **52**, p. 3309-3320 (2017).
6. *Ferroelectric triggering of carbon monoxide adsorption on lead zirco-titanate (001) surfaces*, Tanase, LC; Apostol NG ; Abramiuc, LE; **Tache CA**; Hrib L; Trupina L; Pintilie L; Teodorescu CM, *Scientific Reports* **6**, 35301 (2016).
7. *Non-interacting,  $sp^2$  carbon on a ferroelectric lead zirco-titanate: towards graphene synthesis on ferroelectrics in ultrahigh vacuum*, Apostol NG; Lungu GA; Bucur IC; **Tache CA**; Hrib L; Pintilie L; Macovei D; Teodorescu CM, *RSC Advances* **6**, p. 67883-67887, (2016).
8. *Photoelectron spectroscopy and spectro-microscopy of  $Pb(Zr,Ti)O_3$  (111) thin layers: Imaging ferroelectric domains with binding energy contrast*, Husanu MA ; Popescu DG; **Tache CA**; Apostol NG; Barinov A; Lizzit S; Lacovig P; Teodorescu CM, *Apl. Surf. Sci.* **352**, p.73-81 (2015).
9. *Band bending at free  $Pb(Zr,Ti)O_3$  surfaces analyzed spectroscopy by X-ray photoelectron*, Apostol NG; Stoflea LE; Lungu GA; **Tache CA** Popescu G; Pintilie L;Teodorescu CM, *Material Science and Engineering B-advanced functional Solid-State Materials* **178**,p. 1317-1322, (2013).
10. *ATOMIC STRUCTURE AND MAGNETISM OF PLD DEPOSITED  $TiO_2:Fe$* , Costescu RM; Lungu, GA; Socol G; Gheorghe NG; Macovei D; Negrila CC; Logofatu C; Husanu MA; Popescu, DG; **Tache CA**; Teodorescu CM, *Digest Journal of Nanomaterial and Biostructures* **7**, p. 73-78, (2012).

Dr. Eng. Ioana Cristina Bucur is a researcher in material physics, holding a PhD in this field and a master's degree in Business Management and Engineering. Her professional experience focuses on the growth of thin films through molecular beam epitaxy and their characterization using various techniques such as low energy electron diffraction and electron spectroscopy.

Dr. Eng. Ioana Cristina Bucur defended her Phd Thesis, entitled Correlations between ferroic ordering and charge accumulation at ferroelectric surfaces and interfaces at University of Bucharest, Faculty of Physics in 2018. Her publication list includes 34 articles, many of which are published in ISI-rated journals. These cover a wide range of topics, from the properties of nanostructured materials to studies in solid-state physics. Her activity in the last 5 years is included but not limited in the following publications:

[1] *The Influence of Heteroatom Dopants Nitrogen, Boron, Sulfur, and Phosphorus on Carbon Electrocatalysts for the Oxygen Reduction Reaction*, K.Preuss, A.M. Siwoniku, C.I. Bucur, M.M. Titirici, **CHEMPLUSCHEM** **84**, **5**, **457-464** (2019) WOS:000472975300003 DOI: 10.1002/cplu.201900083 **IF 3.4 AIS 1.550 (Q2)** This article has in total 36 Citations.

[2] *N-Doped Defective Graphene from Biomass as Catalyst for CO<sub>2</sub> Hydrogenation to Methane* B Jurca, C Bucur, A Primo, P Concepcion, VI Parvulescu, H Garcia, **CHEMCATCHEM** **11**, **3**, **985-990** (2019) DOI: 10.1002/cctc.201801984 WOS:000459736500007 **IF 5.501 AIS 1.818 (Q2)** This article has in total 32 Citations.

[3] *CO<sub>2</sub> methanation catalyzed by oriented MoS<sub>2</sub> nanoplatelets supported on few layers graphene*, A Primo, JB He, B Jurca, B Cojocaru, C Bucur, VI Parvulescu, H Garcia, **APPLIED CATALYSIS B-ENVIRONMENTAL** **245**, **351-359**, (2019) 10.1016/j.apcatb.2018.12.034 WOS:000467661700034 **IF 22.1 AIS 2.984 (Q1)** This article has in total 47 Citations.

[4] *Nitrogen-doped graphene as metal free basic catalyst for coupling reactions* , N. Candu, I. Man, A. Simion, B. Cojocaru, S.M. Coman, C. Bucur, A. Primo, H. Garcia, V.I. Parvulescu, **Journal of Catalysis** **376**, **238-247** (2019) , DOI10.1016/j.jcat.2019.07.011, WOS:000488417200025 **IF 8.047 AIS 1.447 (Q1)** This article has in total 15 Citations.

[5] *Mechano-chemical versus co-precipitation for the preparation of Y-modified LDHs for cyclohexene oxidation and Claisen-Schmidt condensations* O. D. Pavel, A.E. Stamate, R. Zăvoianu, I. C. Bucur, R. Bîrjega, E. Angelescu, V. I. Pârvulescu, **Applied Catalysis A: General** **605**, 117797 (2020) WOS:000576786900007 **IF 5.5 AIS 0.856 (Q2)** This article has in total 14 Citations.

[6] *Nanometer-thick films of antimony oxide nanoparticles grafted on defective graphenes as heterogeneous base catalysts for coupling reactions*, A. Simion, N. Candu, B. Cojocaru, S. Coman, C. Bucur, A. Forneli, A. Primo, I.C. Man, V.I. Parvulescu, H. Garcia, **Journal of Catalysis** **390**, 135-149 (2020), DOI10.1016/j.jcat.2020.07.033, WOS:000570256200016 **IF 8.047 AIS 1.447 (Q1)** This article has in total 4 Citations.

[7] *Engineering hydrogenation active sites on graphene oxide and N-doped graphene by plasma treatment*, M. Magureanu, N.B. Mandache, C. Rizescu, C. Bucur, B. Cojocaru, I.C. Man, A. Primo, V.I. Parvulescu, H. Garcia, **Applied Catalysis B**, **287**, 119962 (2021) , DOI10.1016/j.apcatb.2021.119962 , WOS:000632997400001 **IF 22.1 AIS 2.984 (Q1)** This article has in total 10 Citations.

[8] *CO adsorption and oxidation at room temperature on graphene synthesized on atomically clean Pt (001)* N. G. Apostol, I. C. Bucur, G. A. Lungu, C. A. Tache, C. M. Teodorescu, **Catalysis Today**, **366**, 155-163 (2021), WOS:000630058500001 **IF 5.3 AIS 0.835 (Q1)** This article has in total 3 Citations.

[9] *New photoactive mesoporous Ce-modified TiO<sub>2</sub> for simultaneous wastewater treatment and electric power generation* M. Mureseanu, V. Chivu, M. Osiac, M. Ciobanu, C. Bucur, V. Parvulescu, N. Cioatera, **CATALYSIS TODAY** **366**, 164-176 (2021), DOI10.1016/j.cattod.2020.09.035, WOS:000632006400002 **IF 5.3 AIS 0.835 (Q1)** This article has in total 6 Citations.

[10] *From useless humins by-product to Nb@graphite-like carbon catalysts highly efficient in HMF synthesis*, M. El Fergani, N. Candu, M.Tudorache, C. Bucur, N. Djelal, P. Granger, S.M.

Coman, **Applied Catalysis A**, **618**, **118130** (2021), DOI10.1016/j.apcata.2021.118130 **IF 5.5 AIS 0.856 (Q2)** This article has in total 15 Citations.

[11] *Catalytic transformation of the marine polysaccharide ulvan into rare sugars, tartaric and succinic acids*, I. Podolean, S.M. Coman, C. Bucur, C. Teodorescu, S. Kikionis, E. Ioannou, V. Roussis, A. Primo, H Garcia, V.I. Parvulescu, **CATALYSIS TODAY** **383**, **345-357** (2022) DOI10.1016/j.cattod.2020.06.086, WOS:000715022800009 **IF 5.3 AIS 0.835 (Q1)** This article has in total 14 Citations.

[12] *Nanocrystalline rhenium-doped TiO<sub>2</sub>: an efficient catalyst in the one-pot conversion of carbohydrates into levulinic acid. The synergistic effect between Bronsted and Lewis acid sites*, S. Avramescu, C. D. Ene, M. Ciobanu, J. Schnee, F. Devred, C. Bucur, E. Vasile, L. Colaciello, R. Richards, E. M. Gaigneaux, M. N. Verziu, **Catalysis Science & Technology** **12**, **67-180**, (2022) DOI10.1039/d1cy01450a, WOS:000724278700001 **IF 5.0 AIS 0.973 (Q2)** This article has in total 4 Citations.

[13] *Experimental Band Structure of Pb(Zr,Ti)O<sub>3</sub>: Mechanism of Ferroelectric Stabilization*, DG Popescu, MA Husanu, PC Constantinou, LD Filip, L Trupina, CI Bucur, I Pasuk, C Chirila, LM Hrib, V Stancu, L Pintilie, T Schmitt, CM Teodorescu, VN Strocov, **Advanced Science** **10**, **6**, 2023, DOI10.1002/advs.202205476 **IF 15.1 AIS 3.539 (Q1)** This article has in total 2 Citations.

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[1] *Vibrational and photoluminescence properties of the polystyrene functionalized single-walled carbon nanotubes*, M. Baibarac, I. Baltog, S. Lefrant, J.Y. Mevellec, C. Bucur, **Diamond and Related Materials** **17** (7), 1380-1388 (2008).

[2] *Vibrational properties of polyaniline functionalized PbI<sub>2</sub>*, I. Baltog, M. Baibarac, L. Mihut, N. Preda, T. Velula, C. Bucur, M. Husanu, **Romanian Journal of Physics** **54** (7-8), 677-688 (2009).



[3] *The Intercalation of PbI<sub>2</sub> with 2, 2'-bipyridine evidenced by photoluminescence, FT-IR and raman spectroscopy*, N. Preda, L. Mihut, M. Baibarac, I. Baltog, M. Husanu, C. Bucur, T. Velula, **Romanian Journal of Physics** **54**, 667-675 (2008).

[4] *Raman and photoluminescence studies on intercalated lead iodide with pyridine and iodine*, N. Preda, L. Mihut, M. Baibarac, M. Husanu, C. Bucur, I. Baltog, **Journal of Optoelectronics and Advanced Materials** **10** (2), 319-322 (2008).

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[6] *Photoluminescence properties of composites based on zinc oxyde and single-walled carbon nanotubes*, M. Baibarac, I. Baltog, M. Husanu, T. Velula, C. Bucur, L. Mihut, N. Preda, **Journal of Optoelectronics and Advanced Materials** **10** (2), 288-293 (2008).

[7] *Synthesis and optical properties of water-soluble poly(vinylpyrrolidone) - modified fullerene C60*, E. Rusen, B. Marculescu, N. Preda, C. Bucur, L. Mihut, **Polymer Bulletin** **61**, 581-592 (2008) DOI: 10.1007/s00289-008-0985-8

[8] *Room Temperature Ferromagnetic Mn: Ge (001)*, G.A. Lungu, L.E. Stoflea, L.C. Tanase, I.C. Bucur, N. Raduțoiu, F. Vasiliu, I. Mercioniu, C.M. Teodorescu, **Materials** **7** (1), 106-129 (2014). WOS: 000336088500009

[9] *Band bending at copper and gold interfaces with ferroelectric Pb (Zr, Ti)O<sub>3</sub> investigated by photoelectron spectroscopy*, N.G. Apostol, L.E. Ștoflea, L.C. Tanase, I.C. Bucur, C. Chirila, R.F. Negrea, **Applied Surface Science** **354**, 459-468 (2015). WOS: 000363673500032

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[12] *Non-interacting, sp<sup>2</sup> carbon on a ferroelectric lead zirconate-titanate: towards graphene synthesis on ferroelectrics in ultrahigh vacuum*, N. G. Apostol, G. A. Lungu, I. C. Bucur, C. A. Tache, L. Hrib, L. Pintilie, D. Macovei, and C. M. Teodorescu, **RSC Adv.** **6**, 67883 (2016)  
WOS: 000380362700051

[13] *N-Doped graphene as a metal-free catalyst for glucose oxidation to succinic acid*, C. Rizescu, I. Podolean, J. Alberio, V. I Parvulescu, S. M Coman, C. Bucur, M. Puche, H. Garcia, **Green Chemistry** **19**, 1999-2005 (2017).

[14] *Long-range magnetic interaction in Mn<sub>x</sub>Ge<sub>1-x</sub>: structural, spectromicroscopic and magnetic investigations*, L. C. Tanase, G. A. Lungu, L.E. Abramiuc, I. C. Bucur, N. G. Apostol, R. M. Costescu, C. A. Tache, D. Macovei, A. Barinov, C. M. Teodorescu, **Journal of Materials Science** **52**, 3309-3320 (2017). DOI: 10.1007/s10853-016-0618-9 WOS: 000390125500028

[15] *Low-energy electron diffraction from ferroelectric surfaces: Dead layers and surface dipoles in clean Pb(Zr, Ti)O<sub>3</sub>(001)*, C. M. Teodorescu, L. Pintilie, N. G. Apostol, R. M. Costescu, G. A. Lungu, L. Hrib, L. Trupina, L. C. Tanase, I. C. Bucur, A. E. Bocirnea, **Physics Review B** **96**, 115438 (2017). WOS: 000411162800009

[16] *Triggering surface ferroelectric order in Pb(Zr,Ti)O<sub>3</sub>(001) by deposition of platinum*, I. C. Bucur, L.C. Tanase, L.E. Abramiuc, G.A. Lungu, C. Chirila, L. Trupina, N.G. Apostol, R. M. Costescu, R. F. Negrea, L. Pintilie, C. M. Teodorescu, **Applied Surface Science** **432**, 27-33 (2018). WOS: 000416965500006

[17] *Hydrogenolysis of lignin over Ru-based catalysts: The role of the ruthenium in a lignin fragmentation process*, M. Verziu, A. Tirsoaga, B. Cojocaru, C. Bucur, B. Tudora, A. Richel, M. Aguedo, A. Samikannu, J. P. Mikkola, **Molecular Catalysis** **450**, 65–76 (2018). DOI: 10.1016/j.mcat.2018.03.004

[18] *Structural and optical properties of optimized amorphous GeTe films for memory applications*, A. C. Galca, F. Sava, I. D. Simandan, C. Bucur, V. Dumitru, C. Porosnicu, C. Mihai,

A. Velea, **Journal of Non-Crystalline Solids** **499**, 1-7 (2018) DOI: 10.1016/j.jnoncrysol.2018.07.007

[19] *Polarization orientation in lead zirconate titanate (001) thin films driven by the interface with the substrate*, L.C. Tanase, L.E. Abramiuc, D.G. Popescu, A.-M. Trandafir, N. G. Apostol, I. C. Bucur, L. Hrib, L. Pintilie, I. Pasuk, L. Trupină, C. M. Teodorescu, **Physical review applied**, **10**, 034020 (2018) WOS:000444591300003 DOI: 10.1103/PhysRevApplied.10.034020

[20] *Engineering active sites on reduced graphene oxide by hydrogen plasma irradiation: mimicking bifunctional metal/supported catalysts in hydrogenation reactions* A Primo, A Franconetti, M Magureanu, NB Mandache, C Bucur, C Rizescu, B Cojocar, VI Parvulescu, H Garcia, **GREEN CHEMISTRY** **20**, **11**, 2611-2623 (2018), DOI: 10.1039/c7gc03397d, WOS 000434313100023

[21] *Room temperature ferromagnetism and its correlation to ferroelectricity in manganese additioned lead zirco-titanate*, I. C. Bucur, N. G. Apostol, L. E. Abramiuc, L. C. Tănase, C. A. Tache, G. A. Lungu, R. M. Costescu, C. F. Chirilă, L. Trupină, L. Pintilie, C. M. Teodorescu, **Thin Solid Films** **669**, 440-449 (2019) WOS: 000453405600063 DOI: 10.1016/j.tsf.2018.11.018

[22] *The Influence of Heteroatom Dopants Nitrogen, Boron, Sulfur, and Phosphorus on Carbon Electrocatalysts for the Oxygen Reduction Reaction*, K. Preuss, A.M. Siwoniku, C.I. Bucur, M.M. Titirici, **CHEMPLUSCHEM** **84**, **5**, 457-464 (2019) WOS:000472975300003 DOI: 10.1002/cplu.201900083

[23] *N-Doped Defective Graphene from Biomass as Catalyst for CO<sub>2</sub> Hydrogenation to Methane* B Jurca, C Bucur, A Primo, P Concepcion, VI Parvulescu, H Garcia, **CHEMCATCHEM** **11**, **3**, 985-990 (2019) DOI: 10.1002/cctc.201801984 WOS:000459736500007

[24] *CO<sub>2</sub> methanation catalyzed by oriented MoS<sub>2</sub> nanoplatelets supported on few layers graphene*, A Primo, JB He, B Jurca, B Cojocar, C Bucur, VI Parvulescu, H Garcia, **APPLIED CATALYSIS B-ENVIRONMENTAL** **245**, 351-359, (2019) 10.1016/j.apcatb.2018.12.034 WOS:000467661700034

[25] *Nitrogen-doped graphene as metal free basic catalyst for coupling reactions* , N. Candu, I. Man, A. Simion, B. Cojocaru, S.M. Coman, C. Bucur, A. Primo, H. Garcia, V.I. Parvulescu, **Journal of Catalysis** **376**, 238-247 (2019) , DOI10.1016/j.jcat.2019.07.011, WOS:000488417200025

[26] *Mechano-chemical versus co-precipitation for the preparation of Y-modified LDHs for cyclohexene oxidation and Claisen-Schmidt condensations* O. D. Pavel, A.E. Stamate, R. Zăvoianu, I. C. Bucur, R. Bîrjega, E. Angelescu, V. I. Pârvulescu, **Applied Catalysis A: General** **605**, 117797 (2020) WOS:000576786900007

[27] *Nanometer-thick films of antimony oxide nanoparticles grafted on defective graphenes as heterogeneous base catalysts for coupling reactions*, A. Simion, N. Candu, B. Cojocaru, S. Coman, C. Bucur, A. Forneli, A. Primo, I.C. Man, V.I. Parvulescu, H. Garcia, , **Journal of Catalysis** **390**, 135-149 (2020), DOI10.1016/j.jcat.2020.07.033, WOS:000570256200016

[28] *Engineering hydrogenation active sites on graphene oxide and N-doped graphene by plasma treatment*, M. Magureanu, N.B. Mandache, C. Rizescu, C. Bucur, B. Cojocaru, I.C. Man, A. Primo, V.I. Parvulescu, H. Garcia, **Applied Catalysis B**, **287**, 119962 (2021) , DOI10.1016/j.apcatb.2021.119962 , WOS:000632997400001

[29] *CO adsorption and oxidation at room temperature on graphene synthesized on atomically clean Pt (001)* N. G. Apostol, I. C. Bucur, G. A. Lungu, C. A. Tache, C. M. Teodorescu, **Catalysis Today**, **366**, 155-163 (2021), WOS:000630058500001

[30] *New photoactive mesoporous Ce-modified TiO<sub>2</sub> for simultaneous wastewater treatment and electric power generation* M. Mureseanu, V. Chivu, M. Osiac, M. Ciobanu, C. Bucur, V. Parvulescu, N. Cioatera, **CATALYSIS TODAY** **366**, 164-176 (2021), DOI10.1016/j.cattod.2020.09.035, WOS:000632006400002

[31] *From useless humins by-product to Nb@graphite-like carbon catalysts highly efficient in HMF synthesis*, M. El Fergani, N. Candu, M.Tudorache, C. Bucur, N. Djelal, P. Granger, S.M. Coman, **Applied Catalysis A**, **618**, **118130 (2021)**, DOI10.1016/j.apcata.2021.118130

[32] *Catalytic transformation of the marine polysaccharide ulvan into rare sugars, tartaric and succinic acids*, I. Podolean, S.M. Coman, C. Bucur, C. Teodorescu, S. Kikionis, E. Ioannou, V. Roussis, A. Primo, H Garcia, V.I. Parvulescu, **CATALYSIS TODAY** **383**, **345-357 (2022)** DOI10.1016/j.cattod.2020.06.086, WOS:000715022800009

[33] *Nanocrystalline rhenium-doped TiO<sub>2</sub>: an efficient catalyst in the one-pot conversion of carbohydrates into levulinic acid. The synergistic effect between Bronsted and Lewis acid sites*, S. Avramescu, C. D. Ene, M. Ciobanu, J. Schnee, F. Devred, C. Bucur, E. Vasile, L. Colaciello, R. Richards, E. M. Gaigneaux, M. N. Verziu, **Catalysis Science & Technology** **12**, **67-180, (2022)** DOI10.1039/d1cy01450a, WOS:000724278700001

[34] *Experimental Band Structure of Pb(Zr,Ti)O<sub>3</sub>: Mechanism of Ferroelectric Stabilization*, DG Popescu, MA Husanu, PC Constantinou, LD Filip, L Trupina, CI Bucur, I Pasuk, C Chirila, LM Hrib, V Stancu, L Pintilie, T Schmitt, CM Teodorescu, VN Strocov, **Advanced Science** **10**, **6, 2023**, DOI10.1002/advs.202205476

### **International Conferences – ORAL presentation**

1. **I.C.Bucur**, L.C. Tănase, C.M. Teodorescu, Investigation of magnetic and ferroelectric properties of manganese on Pb(Zr,Ti)O<sub>3</sub>, The 9<sup>th</sup> International Conference on Advanced Materials: ROCAM, Bucharest, Romania, Iulie 2017

2. **I.C.Bucur**, L.E.Abramiuc, L.C. Tănase, G.A.Lungu, C. Tache, C.M. Teodorescu, BAND BENDING AT Pt/Pb(Zr,Ti)O<sub>3</sub> INTERFACES investigated by XPS Spectroscopy, ECOSS 2016, Grenoble, France, August 2016
3. **I.C.Bucur**, L.E.Abramiuc, L.C. Tănase, G.A.Lungu, C. Tache, C.M. Teodorescu, BAND BENDING AT PT/PZT INTERFACES, 16th International Balkan Workshop on Applied Physics and Materials Science, Universitatea Ovidius, Constanta, Romania, Iulie 2016

30.01.2024

**Bucur Ioana Cristina**



# Amelia Elena Bocîrnea

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Phone: ; Email:



Amelia-Elena Bocîrnea (AEB) has a research background of ten years in materials science, and in particular, surface sciences. She has started her studies at the University of Craiova as a bachelor student (2010-2013) in the Faculty of Mathematics and Natural Sciences, in the Computational Physics track with the score 9.16/10. After the B.Sc. graduation, she has continued the studies at the Faculty of Physics, University of Bucharest with M.Sc. (2013-2015) in the Advanced Materials and Nanostructures program and Ph.D (2015-2018) in the Solid State Physics program. All her experiments for both M.Sc. and Ph.D. were conducted in the Nanoscale Condensed Matter laboratory, under the supervision of habil. Dr Cristian Mihail Teodorescu. The two academic works *The study of magnetic properties and band bending effects in transition metals, epitaxially deposited, on Ge(001)* (master thesis) and *Magnetism and Schottky barriers at metal/semiconductor interfaces* (Ph.D. defence) were materialized in 4 research articles, two of them treating the nickel and atomically clean Ge(001) interactions, while the others studies dealt with the mechanisms of the Cu/Ge(001), Pt/Ge(001) and Ag/Si(111) interfaces in ultrahigh vacuum conditions, in cases where the metals were gradually deposited on atomically clean semiconductor wafers.

Through the years she was both a student and a research assistant (2013-2019), she was encouraged to be part of the all the steps of the scientific endeavor: not only the participation in the experiments and measurements, data analysis, data interpretation, but she also got to be part in developing strategies for solving the data puzzle, and she participates in the writing of scientific articles she co-authored. Her main expertise is in surface science techniques such as X-ray photoelectron spectroscopy (XPS), molecular beam epitaxy (MBE), e-beam deposition, low energy electron diffraction (LEED), room temperature scanning electron microscopy (RT-STM). In the study of the Ni/Ge(001) she also gained experience in magneto-optic Kerr effect (MOKE) and a deeper understanding of how X-ray absorption spectroscopy (XAS) techniques work.

After her PhD graduation, **in the last 5 years**, she has been constantly encouraged by the group leader and her Ph.D supervisor, habil. CSI. Ph.D. Cristian Mihail Teodorescu to be an independent researcher and to expand her knowledge in any direction she was interested in.

In the first two years (2019-2020) she got to prepare and study catalysts: she has prepared core-shell catalysts by chemical treatments, using both hydrothermal and co-precipitation methods for ethanol to butadiene reaction (some of the results were published in the 6<sup>th</sup> article in her publications list. In this study she also learned how to work in Casa XPS in the quantification of mixed states oxides that show low intensity.

As a part of the group, she got the opportunity to work with complex oxides, such as perovskites thin films. This helped her gain more knowledge regarding the unique capabilities of XPS when it comes to ferroelectric materials, due to the high sensitivity of the technique to the strength of the bonds.

Since 2020 AEB is part of a small team of young researchers who operate the low energy electron microscopy – photoemission electron microscopy (LEEM-PEEM) microscope. Her love for the capabilities of this technique got her interested in chalcogenides, since they show unique crystalline properties depending on their dimensionality, substrate and temperature. These properties made them the ideal system for AEB to analyze by the *in situ* microscopy system.

She then got to network around the institution to find a way to make herself the chalcogenides systems for the study. To this purpose, she got to collaborate to different groups within the institution to produce and to study group IV chalcogenides. She have learned how to obtain flake by physical vapor deposition (PVT). Her research project “Real time observation of the crystalline phase transition in SnSe flakes” gained her a beamtime at the Bessy II Synchrotron, SMART line, in Berlin, Germany in 2023.

Aside for conducting her own studies, AEB has also accomplished deeper knowledge of XPS on the characterization of the surfaces by working with a wider class of materials and by exploring different characteristics.

Her h-index is 5 according to Web of Knowledge, she has coauthored 15 articles while being the first author of 3 of them, and the first author with equal contribution for two of them. In the last 5 years she coauthored 11 articles. She has a permanent position as a Scientific Researcher (CS) since January 2020.

She is a very enthusiastic and hard-working materials scientist and she loves to expand her views in both the systems of study as well as in experimental techniques. As a person, she is friendly, motivated, and creative. AEB is both independent and able to work very well in a group. She has proved in the past that she can follow a plan, but she is also able to come up with fast solutions for solving unexpected problems. She treasures more the human capabilities of the people she works with (such as kindness and awareness) and that the work environment is not toxic, than she cares about the numbers that the working in academia consider as values.

A handwritten signature in blue ink, appearing to be 'AEB', located in the lower right quadrant of the page.



## The publications list of C.S. PhD Amelia-Elena Bocîrnea

1. A. U. Ammar, A. Popa, D. Toloman, S. Macavei, A. Ciorita, A.-E. Bocirnea, M. Stan, E. Erdem, A. M. Rostas *Nitrogen-doped WO<sub>3</sub> nanoparticles as electrode materials in all-in-one supercapacitor devices*, ACS Applied Engineering Materials, **2** (1) 126–135 (2024)  
JIF ? AIS ? c=0 C=0
  2. M. Oumezzine, A. M. Rostas, A. E. Bocirnea, E. K. Hlil, A.- C. Galca *A-site K-doped lanthanum manganite nanocrystalline La<sub>0.67</sub>Ba<sub>0.33</sub>MnO<sub>3</sub> for room-temperature micro-scale magnetic cooling*, Journal of Alloys and Compounds, **976**, 173257 (2024)  
JIF 6.2 AIS 0.736 Q1 c=0 C=0
  3. M. Y. Zaki, F. Sava, I. D. Simandan, A. T. Buruiana, A. E. Bocirnea, I. Stavarache, A. Velea, A. C. Galca, L. Pintilie *From non-stoichiometric CTSe to single phase and stoichiometric CZTSe films by annealing under Sn+Se atmosphere*, Ceramics International, **49** (21), 33692-33702 (2023)  
JIF 5.2 AIS 0.588 Q1 c=0 C=0
  4. Z. Mighri, K. Souiwa, A. M. Rostas, R. E. Patru, A. E. Bocirnea, N. Iacob, V. Kuncser, O. El Khouja, L. N. Leonat, M. Hidouri, H. Nasri, A. C. Galca *Structural and Electrical Properties of Novel Cr/Fe Mixed Transition-Metal Phosphates*, Inorganic Chemistry, **62** (22), 8530–8542 (2023)  
JIF 4.6 AIS 0.749 Q1 c=2 C=2 0 cit in Q1 1 cit in Q2
  5. A.T. Buruiana, A.E. Bocirnea, A.C. Kuncser, T. Tite, E. Matei, C. Mihai, N. Zawadzka, K. Olkowska-Pucko, A. Babiński, M.R. Molas, A. Velea, A.C. Galca *Layered SnSe nanoflakes with anharmonic phonon properties and memristive characteristics*, Applied Surface Science, **599** 153983 (2022)  
JIF 6.7 AIS 0.865 Q1 c=5 C=6 2 cit in Q1 3 cit in Q2
  6. M. Florea\*, A. Bocirnea\*, S. Neațu, A. M. Kuncser, M.-M. Trandafir, F. Neațu *Tuning the acidity by addition of transition metal to Mn modified hollow silica spheres and their catalytic activity in ethanol dehydration to ethylene*, Applied Catalysis A: General, **646** 118860 (2022)  
JIF 5.5 AIS 0.856 Q2 c=2 C=2 0 cit in Q1 1 cit in Q2
  7. M. Y. Zaki, F. Sava, I.-D. Simandan, A. T. Buruiana, I. Stavarache, A. E. Bocirnea, C. Mihai, A. Velea, A.-C. Galca *A Two-Step Magnetron Sputtering Approach for the Synthesis of Cu<sub>2</sub>ZnSnS<sub>4</sub> Films from Cu<sub>2</sub>SnS<sub>3</sub>/ZnS Stacks*, ACS omega, **7**(27) 23800-23814 (2022)  
JIF 4.1 AIS 0.622 Q2 c=6 C=6 2 cit in Q1 2 cit in Q2
  8. A.-T. Buruiana, F. Sava, N. Iacob, E. Matei, A. E. Bocirnea, M. Onea, A.-C. Galca, C. Mihai, A. Velea, V. Kuncser *Micrometer Sized Hexagonal Chromium Selenide Flakes for Cryogenic Temperature Sensors*, Sensors, **21**(23) 8084 (2021)  
JIF 3.9 AIS 0.607 Q2 c=3 C=4 2 cit in Q1 2 cit in Q2
  9. M.M. Trandafir, S. Neatu, A. Bocirnea, J. Counsell, F. Cavani, M. Florea, and F. Neatu *The Role of Acidity in Terephthalic Acid Synthesis from Renewable Carbon Source*, ChemCatChem, **12**(24) 6248-6258 (2020)  
JIF 4.5 AIS 0.891 Q2 c=3 C=3 1 cit in Q1 2 cit in Q2
  10. A. E. Bocîrnea\*, D. G. Popescu\*, C. Chirila, R. M. Costescu, V. Kuncser, V. Stancu, L. Trupina, I. Pasuk, A. M. Vlaicu and M. A. Husanu *Polarization dependent magnetism of the Ni/BaTiO<sub>3</sub> interface*, Physical Review Materials, **4**, 034402 (2020)  
JIF 3.4 AIS 1.116 Q2 c=5 C=5 2 cit in Q1 3 cit in Q2
  11. A. E. Bocîrnea, R. M. Costescu, N. G. Apostol, C. M. Teodorescu *Growth of Ag(111) on Si(111) with flatband and abrupt interface*, Applied Surface Science, **473**, 433-441 (2019)  
JIF 6.7 AIS 0.865 Q1 c=4 C=4 1 cit in Q1 3 cit in Q2
- 
12. A. E. Bocîrnea, L. C. Tănase, R. M. Costescu, N. G. Apostol, C. M. Teodorescu *Band bending and magnetism at Ni/Ge(001) interface investigated by X-Ray photoelectron spectroscopy*, Applied Surface Science, **424**, 269-274 (2017)  
JIF 6.7 AIS 0.865 Q1

13. A. E. Bocîrnea, R. M. Costescu, I. Pasuk, G. A. Lungu, C. M. Teodorescu *Structural and magnetic properties of Ni nanofilms on Ge(001) by molecular beam epitaxy*, Applied Surface Science, **424** 337-344 (2017)  
JIF 6.7 AIS 0.865 Q1
14. C. M. Teodorescu, L. Pintilie, N. G. Apostol, R. M. Costescu, G. A. Lungu, L. M. Hrib, L. Trupina, L. C. Tanase, I. C. Bucur, A. E. Bocîrnea *Low-energy electron diffraction from ferroelectric surfaces: Dead layers and surface dipoles in clean Pb(Zr,Ti)O<sub>3</sub>(001)*, Physical Review B., **96**(11) (2017)  
JIF x AIS 0.970 Q1
15. L. C. Tănase, A. E. Bocîrnea, A. B. Şerban, L. E. Ştoflea, I. C. Bucur, G. A. Lungu, R.M. Costescu, C. M. Teodorescu *Growth and band bending studies in Cu/Ge(001) and Pt/Ge(001) investigated by photoelectron spectroscopy*, Surface Science, **653**, 97–106 (2016)  
JIF 1.9 AIS 0.365 Q3

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? - the journal did not receive JIF and AIS yet  
 JIF represents Journal Impact Factor  
 AIS represents Article Influence Score  
 \*- marks the first authors with equal contributions  
 the line marks the end of the last 5 years period  
 C- the total number of citations  
 c- the number of citations without self citations  
 cit- abbreviation for citations

## **Adrian – Constantin Pena**

Adrian – Constantin Pena was born in Ploiești on July 11, 1990. In 2005, he graduated from the "Mihai Viteazul" National College in Ploiești, continuing his studies at the Faculty of Commerce (currently Business and Tourism) within the Bucharest Academy of Economic Studies. After obtaining his bachelor degree in 2012, he focused on the study of Physics, enrolling in the Faculty of Physics of the University of Bucharest. Also, in 2013, he enrolled in the Master's program of Business (Bucharest Academy of Economic Studies), graduating in 2015. In 2016, he obtained an engineering degree, graduating from the Technological Physics department, with a thesis in the field of Quantum Electrodynamics entitled "The Mott Effect". He continued in the same year with the Master's program in Theoretical and Computational Physics, still focusing his attention on the processes of Quantum Electrodynamics. In 2018, Adrian Pena obtained his MSc degree, completing his studies with the thesis entitled "Polarization Effects in Double Compton Scattering". In 2018, he enrolled in the Physics Doctoral Study School of the University of Bucharest, Condensed Matter Physics section, obtaining his PhD in 2023 with the thesis "Control of the electrical, topological and transport properties of graphene by applying external fields", under the supervision of Mr. SR I Dr. Habil. Cristian-Mihail Teodorescu, with the "Excellent" grade.

In 2018, Adrian Pena started to work at the National Institute of Materials Physics, as Assistant Researcher, in the Surface and Interface Science group. During 2018-2019, Adrian Pena participated in synthesis experiments (Molecular-Beam Epitaxy) and characterization (X-ray Photoelectron Spectroscopy, Low Energy Electron Diffraction) of 2D systems, for instance, the deposition of Si and Ge layers, doped with magnetic impurities (Ni, Mn), on Si(111) substrate. Also, in 2019, he participated in graphene deposition experiments on a Pt(001) substrate, at "Sincrotrone Elettra Trieste SepA" synchrotron facility, where the control of the spin polarization in graphene by hydrogenation has been investigated, using the "Spin Resolved X-ray Photoelectron Spectroscopy" technique. Besides the materials physics, Adrian Pena also continued the study of Quantum Electrodynamics and Relativistic Quantum Mechanics, a formalism within the physics of graphene is modeled. The knowledge thus deepened was applied in the period 2020-2021 in the theoretical study of graphene quantum dots, investigating the control of their electron trapping properties by applying external fields. Mainly, electron scattering effects on graphene quantum dots were investigated, highlighting resonances characterized by quasi-bound states of the electrons inside the respective quantum dots. These studies materialized through the publication of three scientific articles in ISI indexed journals, Adrian Pena being the sole author, as follows:

- Adrian Pena, *Electron trapping in twisted light driven graphene quantum dots*, Physical Review B **105**, 045405 (2022);
- Adrian Pena, *Lifetime enhancement of quasibound states in graphene quantum dots via circularly polarized light*, Physical Review B **105**, 125408 (2022);
- Adrian Pena, *Electron trapping in magnetic driven graphene quantum dots*, Physica E: Low Dimensional Systems & Nanostructures **141**, 115245 (2022).

In 2022, Adrian Pena began the theoretical study of 2D topological insulators (Chern insulators), investigating the phenomenon of time reversal symmetry breaking by irradiation with a circularly polarized light beam (Floquet topological insulators) or by immersion in a magnetic field. Within these theoretical analyses, he characterized the topological phase transitions by means of Chern numbers, correlating the identified topological phases with the spectral properties of the studied systems. He also studied quantum charge transport phenomena using Landauer-Büttiker method, confirming the topological phases triggered by the application of circularly polarized light and/or magnetic field. So far, the studies have materialized through the following ISI works:

- Adrian Pena, *Control of spectral, topological and charge transport properties of graphene via circularly polarized light and magnetic field*, Results in Physics **46**, 106257 (2023);
- Adrian Pena, and Cristian Radu, *Floquet topological insulators with spin-orbit coupling*, Physical Review B (accepted manuscript, 2024).

In 2023, Adrian Pena advanced to the position of Scientific Researcher. He is currently conducting research activities on the spin-orbit interaction in 2D and 3D topological insulators, modeling the physics of these systems in order to propose new protocols for topological phases control. At the same time, together with the research team, he elaborates the strategy of future experiments concerning the effect of circularly polarized light on 3D topological insulators with spin-orbit interaction (Bi<sub>2</sub>Se<sub>3</sub> and SnTe).

Măgurele, 29.01.2024

Signature



PUBLICATIONS LIST  
Adrian – Constantin Pena

(1) Adrian Pena, and Cristian Radu, *Floquet topological insulators with spin-orbit coupling*, Physical Review B (acceptat spre publicare, 2024). AIS = 0.971, JIF = 3.7.

(2) Adrian Pena, *Control of spectral, topological and charge transport properties of graphene via circularly polarized light and magnetic field*, Results in Physics **46**, 106257 (2023). AIS = 0.654, JIF = 5.3. [DOI: 10.1016/j.rinp.2023.106257]

Cited by (total 1 citation, 0 autocitations):

1. Yifan Wu, Pinggen Cai, Qingmiao Nie, Chaojun Tang, Fanxin Liu, Mingwei Zhu, *Ultra-narrowband, electrically switchable, and high-efficiency absorption in monolayer graphene resulting from lattice plasmon resonance*, Results in Physics **51**, 106768 (2023). [DOI: 10.1016/j.rinp.2023.106768]

(3) Adrian Pena, *Electron trapping in magnetic driven graphene quantum dots*, Physica E: Low Dimensional Systems & Nanostructures **141**, 115245 (2022). AIS = 0.435, JIF = 3.3. [DOI: 10.1016/j.physe.2022.115245]

Cited by (total 2 citations, 0 autocitations):

1. Mohammed El Azar, Ahmed Bouhlal, Abdulaziz D. Alhaidari, and Ahmed Jellal, *Effect of magnetic flux on scattering in a graphene magnetic quantum dot*, Physica B **675**, 415610 (2024). [DOI: 10.1016/j.physb.2023.415610]
2. Mohammed El Azar, Ahmed Bouhlal, and Ahmed Jellal, *Electrons trapped in graphene magnetic quantum dots with mass term*, Comput. Mater. Sci. **231**, 112573 (2024). [DOI: 10.1016/j.commatsci.2023.112573]

(4) Adrian Pena, *Lifetime enhancement of quasibound states in graphene quantum dots via circularly polarized light*, Physical Review B **105**, 125408 (2022). AIS = 0.971, JIF = 3.7. [DOI: 10.1103/PhysRevB.105.125408]

Cited by (total 1 citation, 0 autocitations):

1. Mohammed El Azar, Ahmed Bouhlal, Abdulaziz D. Alhaidari, and Ahmed Jellal, *Effect of magnetic flux on scattering in a graphene magnetic quantum dot*, Physica B **675**, 415610 (2024). [DOI: 10.1016/j.physb.2023.415610]

(5) Adrian Pena, *Electron trapping in twisted light driven graphene quantum dots*, Physical Review B **105**, 045405 (2022). AIS = 0.971, JIF = 3.7. [DOI: 10.1103/PhysRevB.105.045405]

Cited by (total 4 citations, 2 autocitations):

1. Mohammed El Azar, Ahmed Bouhlal, Abdulaziz D. Alhaidari, and Ahmed Jellal, *Effect of magnetic flux on scattering in a graphene magnetic quantum dot*, *Physica B* **675**, 415610 (2024). [DOI: [10.1016/j.physb.2023.415610](https://doi.org/10.1016/j.physb.2023.415610)]
2. Zhiwei Cui, Wanqi Ma, Shuaishuai Ren, and Wenjuan Zhao, *Tunable optical chirality of twisted light with graphene*, *Opt. Commun.* **549**, 129899 (2023). [DOI: [10.1016/j.optcom.2023.129899](https://doi.org/10.1016/j.optcom.2023.129899)]
3. Adrian Pena, *Electron trapping in magnetic driven graphene quantum dots*, *Physica E: Low Dimensional Systems & Nanostructures* **141**, 115245 (2022). [DOI: [10.1016/j.physe.2022.115245](https://doi.org/10.1016/j.physe.2022.115245)]
4. Adrian Pena, *Lifetime enhancement of quasibound states in graphene quantum dots via circularly polarized light*, *Physical Review B* **105**, 125408 (2022). [DOI: [10.1103/PhysRevB.105.125408](https://doi.org/10.1103/PhysRevB.105.125408)]

Elena-Larisa Borcan, Ph.D. student

Elena-Larisa Borcan was born on April 18th, 1993. Obtained her Bachelor of Science in the field of Engineering Physics at the Faculty of Applied Science (University Politehnica of Bucharest) focused on using the Doppler Technique for studying materials by positronic annihilation and was coordinated by Prof. Dr. Gheorghe Căta-Danil. She pursued a Master of Science at the same institution in the field of Engineering and Applications of Lasers and Accelerators. In the meantime, received a position as Scientific Research Assistant at National Institute of Research and Development in Materials Physics (NIMP), Laboratory of Surface and Interface Science, headed by Dr. habil. Cristian-Mihail Teodorescu, who also supervised her thesis “Molecular Beam Epitaxy of Pt on Si(111)”.



At the moment she is a Ph.D. student at the Physics Faculty of University of Bucharest and she is doing research for her Ph.D. thesis: “Study of surfaces, interfaces and heterostructures which shows spin asymmetry in the electronic density of states”, under the supervision of Dr. habil. Cristian-Mihail Teodorescu.

She is involved in various projects within the institution, using a variety of surface science techniques, like: deposition of thin films by molecular beam epitaxy (MBE), X-ray photoelectron spectroscopy (XPS), low energy electron diffraction (LEED) and Angular-Resolved Photo-Emission Spectroscopy for the characterization of surfaces and interfaces. Also, Larisa is involved in experiments that are using synchrotron radiation at Elettra Sincrotrone Trieste, Italy.

**Publications in the last 5 years (after January 31, 2019):**

1. A. M. Hada, A. M. Craciun, M. Focsan, A. Vulpoi, E. L. Borcan, S. Astilean, *Glutathione-capped gold nanoclusters as near-infrared-emitting efficient contrast agents for confocal fluorescence imaging of tissue-mimicking phantoms*, *Microchimica Acta* **189**(9), 2022 - **Q1** (2 citations, no self-citation)
2. R. Bucuresteanu, L. M. Ditu, M. Ionita, I. Calinescu, V. Raditoiu, B. Cojocaru , L. O. Cinteza, C. Curutiu, A. M. Holban, M. Enachescu, L. B. Enache, G. Mustatea, V. Chihaiia, A. Nicolaev , E. L. Borcan and G. Mihaescu *Preliminary Study on Light-Activated Antimicrobial Agents as Photocatalytic Method for Protection of Surfaces with Increased Risk of Infections*, *Materials* **14**(18) 2021 - **Q2** (1 citation, 2 self-citations)



# Irina Ion

Research Assistant /  
PhD student



0009-0009-9979-638X

## SCHOOLS

### NANOSUM

International Summer School  
on Nanosciences &  
Nanotechnologies  
2023 | Marseille, France

Highlights:

- worked in a diverse group on the topic of topological insulators;

### ESONN

European School on  
Nanosciences &  
Nanotechnologies  
2023 | Grenoble, France

Highlights:

- Fabricated electronic devices in the cleanroom;
- Attended experiment on NV centers in diamond for quantum computing applications;

## CONFERENCES

### ISCOMS

2022 | Groningen, NL  
Attended (online)

### OSA Quantum 2.0 Conference

2020 | Online  
Attended

### NNV Atomic Molecular and Optical Physics

2019 | Lunteren, NL  
Attended

## PROFILE

I am a research assistant in the Surfaces and Interfaces group at NIMP, working on an electron microscope while learning how other material characterization techniques are employed in fundamental or applications studies. I am also a PhD student at the University of Bucharest, focused on studying quantum correlations from a theoretical point of view. I hope to continue my career by working with people from both worlds to create real-world devices that harness quantum correlations.

## PROFESSIONAL EXPERIENCE

### Research assistant

National Institute of Materials Physics  
2020 – present | Magurele, Romania

I work in the Surfaces and Interfaces group mainly on the LEEM/PEEM instrument. Me and my closest colleagues are a small team of young researchers who were given freedom and guidance by our group leader to train ourselves to use this complex instrument for our research. Having dealt with technical issues and having kept close contact with the producer of the instrument, I am currently planning to develop a guide so that new users can easily include this electron microscopy technique in their research.

Together with a colleague, I participated in an experiment at Berlin's Bessy II SMART line, which involved characterization of SnSe flakes on silicon using all available techniques. Through analysis of the obtained data, we want to understand the best conditions for fabricating these flakes which could potentially be used in novel thermoelectric devices.

## EDUCATION

### PhD - Theoretical Physics

University of Bucharest, Faculty of Physics  
2022 – present | Bucharest, Romania

During this PhD, I set out to study quantum correlations beyond entanglement used in quantum information theory. This may be included in the RoNaQCI (part of the European Quantum Communication Infrastructure) project.

I am writing scripts in Octave/MATLAB to perform calculations on metrics for quantum discord and steering in order to better understand situations where such correlations are important.

### MSc Physics - Advanced materials (120 ECTS)

University of Groningen, Faculty of Science and Engineering  
2020 | Groningen, The Netherlands

I followed this program under the top-ranked Zernike Institute for Advanced Materials due to its focus on the design and scientific study of materials for functionality. I gained a solid background for future research activities having followed theoretical and experimental courses that involved a high degree of independent work, in the form of solving problems, writing reports and giving presentations, as well as working in diverse teams. (60 ECTS)



## SKILLS

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### Languages

Romanian - Native / full working proficiency (C2)

English - Native / full working proficiency (C1/C2)

Norwegian - High proficiency (C1)

Dutch - High proficiency (B2/C1)

German - Elementary proficiency (A2)

Russian - Beginner (A1)

### Technical

LaTeX

MATLAB and Octave

LibreOffice and Microsoft Office

VESTA

### Courses

Academic writing and presentation


## SIGNATURE

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Through a close collaboration with the Quantum Devices group, I wrote my thesis titled: "*Microwave driving of transition metal defect spins coupled to nuclear spins in silicon carbide*", graded 8/10 (60 ECTS).

Within the quantum mechanics formalism, I have analyzed the theoretical possibility of harnessing localized spins in specific color centers in silicon carbide for use in devices for quantum information technologies. To perform calculations, I have written various scripts which were further used by the team. This novel work has been included in the following publication: <https://doi.org/10.1088/1367-2630/ac1641> 

### BSc Physics - Physics (180 ECTS)

University of Bucharest, Faculty of Physics  
2013 | Bucharest, Romania

I followed this program focused on laying the basics of physics and offering various opportunities for further specialization. For my bachelor thesis (30 ECTS, graded 10/10), I performed calculations together with my supervisor for the topic of: "*Reduction of ballistic spin scattering in spin field effect transistors*".

### International Baccalaureate

Trondheim Katedralskole

2010 | Trondheim, Norway

By following this program with a close-knit group of students with very diverse backgrounds, I developed abilities to communicate honestly and openly while being sensible to cultural differences. Moreover, this program has taught me how to learn, creatively, having studied subjects as:

- Higher level subjects: Mathematics, Physics, Chemistry, English
- Standard level subjects: History, Norwegian

Finally, the program included an Extended Essay which I chose to do in Mathematics, where I studied the CCTV building in Beijing from a symmetry point of view (graded A - highest).

Publications (co-author, affiliation: University of Groningen):

C. M Gilardoni, **Irina Ion**, F. Hendriks, M. Trupke, C. H van der Wal, “*Hyperfine-mediated transitions between electronic spin-1/2 levels of transition metal defects in SiC*”, New Journal of Physics **23**, 083010 (2021).

<https://doi.org/10.1088/1367-2630/ac1641>

**JIF = 3.3, AIS = 1.341, Q1**

**Total citations: 4 (3 Q1, 1 Q2)**

**Citations without self-citations: 2 (1 Q1, 1 Q2)**

# Curriculum Vitae

Alexandru-Cristi Iancu is a Romanian male born on 15/08/1997. His email address is

and you can reach him at (

In his role as a Research Assistant (ACS) at the National Institute of Materials Physics (NIMP), located on Strada Atomistilor Nr. 405A, 077125 Magurele, Romania, Alexandru-Cristi engages in various activities. These include atomically cleaning thin wafers, particularly of germanium and silicon, through electron bombardment. He is also involved in thin film and ultra-thin film deposition using Molecular Beam Epitaxy (MBE). His responsibilities extend to surface characterization using X-Ray Photoelectron Spectroscopy (XPS) and Low Energy Electron Diffraction (LEED). Additionally, Alexandru-Cristi possesses general knowledge about instruments such as Scanning Tunneling Microscope (STM), Auger Electron Spectroscopy (AES), and Reflection-High Energy Electron Diffraction (RHEED).

His academic journey began at Liceul Teoretic "Horia Hulubei," where he obtained his high school diploma (Baccalaureate diploma) in Mathematics-Informatics. This was between 15/09/2012 and 15/06/2016, and he covered subjects such as basic principles in programming languages like C++ and HTML. He also gained advanced proficiency in the Microsoft Office package and participated in socio-cultural experiences through Olympiads.

Moving on to higher education, Alexandru-Cristi pursued a Bachelor's Degree in Physics-Informatics at University of Bucharest, Faculty of Physics. This spanned from 01/10/2016 to 01/07/2019, and his thesis focused on computational investigations of the Ising model. During this period, he honed skills in laboratory equipment usage, developed code and algorithms for Monte Carlo simulations, and enhanced his analytical thinking. Additionally, he acquired knowledge in the field of "scientific research and development," AUTOCAD skills, and proficiency in programs like Origin, Qtiplot, Mathematica, and Latex. His abilities extended to data analysis and improving project/speech presentation skills.

For further specialization, Alexandru-Cristi pursued a Master's Degree in Physics of Advanced Materials and Nanostructures from 01/10/2019 to 01/07/2021. His thesis focused on Zirconium oxide grown on Ge(001) by molecular beam epitaxy.

Currently, Alexandru-Cristi is a PhD Student at the University of Bucharest, Faculty of Physics having as coordinator Dr. Habil Cristian-Mihail Teodorescu, conducting research in the field of Condensed Matter Physics. His doctoral studies commenced on 01/10/2021.

In addition to his academic achievements, Alexandru-Cristi possesses a range of digital skills, including proficiency in Microsoft Office, Excel, Word, PowerPoint, Google Docs, Zoom, Outlook, and Igor (Wavemetrics).

His organizational and managerial skills are characterized by planning ability, promptness, seriousness, negotiation skills, and the capacity to outline project stages.

Furthermore, Alexandru-Cristi excels in communication, demonstrating the ability to present essential information, active listening, persuasive communication, and professional interaction.

In 2019, Alexandru-Cristi Iancu gained a basic understanding of the molecular beam epitaxy technique, involving tasks such as cleanings, mounting, and testing a new in-house evaporator, and depositing thin films. He also embarked on learning the X-ray Photoemission Spectroscopy technique to identify elements.

By 2020, his expertise in molecular beam epitaxy advanced, incorporating the use of Low Energy Electron Diffraction to evaluate the surface reconstruction of Ge (001) and depositing thin layers of metals analyzed through XPS. Notably, he conducted electric measurements on a BaTiO<sub>3</sub> ferroelectric sample with deposited graphene, exploring hysteresis loops by measuring surface resistance.

In 2021, Alexandru expanded his skill set by learning new techniques, including the sputtering technique for surface cleaning and depth profiling for XPS. He also employed the Quartz microbalance to record thin film growth rates and simulated XPS spectra with Voigt functions, performing data analysis to identify individual bonds and stoichiometry on surface samples.

In 2022, his role as a scientific research assistant involved measuring samples for researchers and conducting various depositions to study the Rashba spin orbit interaction in Metal/semiconductor and Metal/GeTe interfaces. He experimented with different sample wafers (Si 111, Ge 111).

By 2023, Alexandru had acquired proficiency in the Angle-resolved photoemission spectroscopy (ARPES) technique, investigating the band structure of the first few atomic layers. He studied HfO<sub>2</sub> surfaces obtained by molecular beam epitaxy on different substrates and delved into depth profiling and understanding of borophene surfaces on sapphire substrates by XPS. Additionally, he gained a basic understanding of the Magneto-optic Kerr effect (MOKE) and performed valence band

measurements of Si 001 wafers with nanograving (NG) of up to 40 nm depths. His experiments included ARPES measurements at Paul Scherrer Institute, Swiss Light Source, and XPS measurements at Elettra Sincrotrone Trieste, investigating Rashba spin splitting interactions and CO absorption on different surfaces, respectively.

In a nutshell, Alexandru's journey isn't just a list of achievements, it's a testament to his passion and dedication in the world of physics.

A handwritten signature in blue ink, appearing to be 'Jx' or similar, located on the right side of the page.

**DECLARAȚIE**  
**de consimțământ privind prelucrarea datelor cu caracter personal**

Subsemnatul, Teodorescu Cristian Mihail, având calitatea de lider de echipă, declar că:

- am fost informat cu privire la prevederile Regulamentului (UE) 679/26 aprilie 2016 privind protecția persoanelor fizice în ceea ce privește prelucrarea datelor cu caracter personal și privind libera circulație a acestor date;
- am fost informat că beneficiaz de dreptul de acces, de intervenție asupra datelor mele și dreptul de a nu fi supus unei decizii individuale;
- am fost informat că datele cu caracter personal urmează să fie prelucrate și stocate în cadrul Ministerului Cercetării, Inovării și Digitalizării;
- am fost informat că prelucrarea datelor mele cu caracter personal este necesară în vederea obligațiilor legale ce îmi revin Ministerului Cercetării, Inovării și Digitalizării în cadrul programului „Gala Cercetării Românești“, precum și în scopul intereselor și drepturilor ce îmi revin, conform regulamentului Galei;
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În consecință, îmi dau consimțământul pentru prelucrarea, transmiterea și stocarea datelor cu caracter personal în cadrul Ministerului Cercetării, Inovării și Digitalizării.

Lider de echipă

Nume și prenume: Teodorescu Cristian Mihail

Data: 30.01.2024

Semnătura

