

Rodica Cristescu_Functionalized flavonoid-biopolymer nanostructured composites processed for antibacterial activity_PN-II-ID-PCE-2011-3-0888

(i) project title: Functionalized flavonoid-biopolymer nanostructured composites processed for antibacterial activity

(ii) acronym:

(iii) principal investigator: Rodica Cristescu

(iv) project code: PN-II-ID-PCE-2011-3-0888 (Contract 209/2011)

(v) implementation duration: 2011-2016

(vi) project resume:

Although many antimicrobial agents are currently available for the treatment of microbial infections, the emergence and spreading of antibiotic-resistant microorganisms is a global problem. To overcome this issue, we must explore the use of alternative antimicrobial agents, including naturally-derived agents. In this project, biopolymer-antibiotic, biopolymer-flavonoid, biopolymer-antibiotic-flavonoid composite coatings will be deposited onto assays by matrix assisted pulsed laser evaporation (MAPLE) using a pulsed KrF* excimer laser source ($\lambda = 248 \text{ nm}$, $\tau = 25 \text{ ns}$, $\nu = 10 \text{ Hz}$). FTIR spectroscopy will be used to demonstrate that MAPLE-transferred materials exhibit chemical properties similar to those of the starting materials. Atomic force microscopy will confirm that MAPLE may be used to fabricate thin films with appropriate surface properties for medical use. The activity of flavonoid-containing films against both Gram- + and Gram- – bacteria will be examined using in vitro biological assays. The biological properties to be tested include the microbial viability and adherence to the flavonoid-containing films, using Gram - and Gram + bacterial strains with known antibiotic susceptibility behavior, the microbial adherence to the HeLa cells monolayer grown on the of flavonoid-containing coating, and the cytotoxicity on eukariotic cells. Our specific goal is to evaluate these results in comparison to biopolymer-silver nanoparticle coatings as controls. The proposed system could be used for the development of novel antimicrobial materials or strategies for fighting medical biofilm pathogens frequently implicated in the etiology of biofilm associated chronic infections

(vii) objectives:

Selection of flavonoids (quercetin, resveratrol, and picnogenol), biopolymers (PLGA, PEG, and PVA) and antibiotics (gentamicin, and cephalosporins) used in experimental studies. Target preparation used in MAPLE experiments. Selection of the best solvents, establishing proper concentration of flavonoids (quercetin, resveratrol, and picnogenol), biopolymers (PLGA, PEG, and PVA) and antibiotics (gentamicin, and cephalosporins) and freezing them at the liquid nitrogen temperature. MAPLE-deposition of nanostructures of flavonoids (quercetin, resveratrol, and picnogenol), biopolymers (PLGA, PEG, and PVA) and antibiotics (gentamicin, and cephalosporins) composite coatings onto silicon wafers, quartz, optical glass and titan slides by a KrF* pulsed excimer laser ($\lambda = 248 \text{ nm}$, $\tau = 25 \text{ ns}$, $\nu = 10 \text{ Hz}$). Characterization of nanostructures obtained by complementary investigations techniques: optical microscopy, Fourier transforms infrared spectroscopy, atomic force microscopy and scanning electron microscopy. In vitro biological assays tests include the microbial viability and the microbial adherence to flavonoid-containing films, using Gram - and Gram + bacterial strains with known antibiotic susceptibility behavior, the microbial

adherence to the HeLa cells monolayer grown on the of flavonoid-containing coating, and the cytotoxicity on eukariotic cells.

(viii) list of dissemination and communication list:

ISI Peer-reviewed research publications (13):

*Corresponding author

1. R. Cristescu, G. Dorcioman, F.M. Miroiu, G. Socol, I.N. Mihailescu, S.D. Gittard, P.R. Miller, R.J. Narayan, M. Enculescu, D.B. Chrisey, Antimicrobial Activity Of Biopolymer–Antibiotic Thin Films Fabricated By Advanced Pulsed Laser Methods, *Applied Surface Science* 278 (2013) 211–213. - I.F. = 2.538.
2. D.E. Mihaiescu, R. Cristescu, G. Dorcioman, C.E. Popescu, C. Nita, G. Socol, I.N. Mihailescu, A.M. Grumezescu, D. Tamas, M. Enculescu, R.F. Negrea, C. Ghica, C. Chifiriuc, C. Bleotu and D.B. Chrisey, Functionalized magnetite silica thin films fabricated by MAPLE with antibiofilm properties, *Biofabrication* 5 (2013) 015007. – I.F. = 4.302.
3. S. Iordache, R. Cristescu, A.C. Popescu, C.E. Popescu, G. Dorcioman, I.N. Mihailescu, A.A. Ciucu, A. Balan, I. Stamatin, E. Fagadar-Cosma, and D.B. Chrisey, Novel Nanostructured Porphyrin Conjugate Thin Films Deposited By MAPLE, *Applied Surface Science* 278 (2013) 207–210. – I.F. = 2.538.
4. R. Cristescu, C. Popescu, G. Socol, I. Iordache, I.N. Mihailescu, D.E. Mihaiescu, A.M. Grumezescu, A. Andronie, I. Stamatin, C. Chifiriuc, C. Bleotu, C. Saviuc, M. Popa, and D.B. Chrisey, Magnetic Core/Shell Nanoparticle Thin Films Deposited By MAPLE: Investigation By Chemical, Morphological And In Vitro Biological Assays, *Applied Surface Science* 258 (2012) 9250–9255. – I.F. = 2.112.
5. G. Socol, M. Socol, L. Sima, S. Petrescu, M. Enculescu, F. Sima, M. Miroiu, G. Popescu-Pelin, N. Stefan, R. Cristescu, C.N. Mihailescu, A. Stanculescu, C. Sutan, I.N. Mihailescu, Combinatorial Pulsed Laser Deposition of Ag-Containing Calcium Phosphate Coatings, *Digest Journal of Nanomaterials and Biostructures* 7(2) (2012) 563-576. – I.F. = 1.092.
6. A. C. Popescu, G. E. Stan, L. Duta, G. Dorcioman, O. Iordache, I. Dumitrescu, I. Pasuk, I. N. Mihailescu, Influence of a hydrophobin underlayer on the structuring and antimicrobial properties of ZnO films, *Journal of Materials Science* 48(23) (2013) 8329-8336. – I.F. = 2.305.
7. Alina Maria Holban, Valentina Grumezescu, Alexandru Mihai Grumezescu, Bogdan Stefan Vasile, Roxana Trusca, Rodica Cristescu, Gabriel Socol and Florin Iordache, Antimicrobial Nanospheres Thin Coatings Prepared by Advanced Pulsed Laser Technique, *Beilstein J. Nanotechnol.* 5 (2014) 872–880. – I.F. = 2.332.
8. R. Cristescu, A.V. Surdu, A.M. Grumezescu, A.E. Oprea, R. Trusca, O. Vasile, G. Dorcioman, A. Visan, G. Socol, I.N. Mihailescu, D. Mihaiescu, M. Enculescu, M.C. Chifiriuc, R.D. Boehm, R.J. Narayan, and D.B. Chrisey, Microbial Colonization of Biopolymeric Thin Films Containing Natural Compounds and Antibiotics Fabricated by MAPLE, *Applied Surface Science* 336 (2015) 234–239. – I.F. = 3.150.
9. A.M. Grumezescu, R. Cristescu, M.C. Chifiriuc, G. Dorcioman, G. Socol, I.N. Mihailescu, D.E. Mihaiescu, A. Ficai, O. Vasile, M. Enculescu, D.B. Chrisey, Fabrication of Magnetite-Based Core-Shell Coated Nanoparticles With Antibacterial Properties, *Biofabrication* 7 (2015) 015014. – I.F. = 4.702.
10. F.M. Miroiu, N. Stefan, A.I. Visan, C. Nita, C.R. Luculescu, O. Rasoga, M. Socol, I. Zgura, R. Cristescu, D. Craciun, G. Socol, Composite biodegradable biopolymer coatings of Silk Fibroin – Poly(3-Hydroxybutyric-acid-co-3-Hydroxyvaleric-acid) for biomedical applications, *Applied Surface Science* 355(2015) 1123–1131. – I.F. = 3.150.
11. R. Cristescu, A. Visan, G. Socol, A.V. Surdu, A.E. Oprea, A.M. Grumezescu, M.C. Chifiriuc, R.D. Boehm, D. Yamaleyeva, M. Taylor, R.J. Narayan, and D.B. Chrisey, Antimicrobial Activity of Biopolymeric Thin Films Containing Flavonoid Natural Compounds and Silver Nanoparticles Fabricated by MAPLE: A Comparative Study, *Applied Surface Science* 374 (2016) 290-296. - IF = 3.150

12. A. Visan, R. Cristescu, N. Stefan, M. Miroiu, C. Nita, I.N. Mihailescu, G. Socol, M. Socol, C. Florica, O. Rasoga, I. Zgura, L.E. Sima, M. Chiritoiu, M.C. Chifiriuc, A.M. Holban, Antimicrobial Polycaprolactone/Polyethylene Glycol Embedded Lysozyme Coatings of Ti Implants for Osteoblast Functional Properties in Tissue Engineering, *Applied Surface Science* 417 234-243 (2017).- IF = 4.439
13. A.M. Iordache, R. Cristescu, E. Fagadar-Cosma, A.C Popescu, A.A Ciucu, S.M Iordache, A. Balan, C. Nichita, I. Stamatin, and D.B Chrisey, Histamine Detection using Functionalized Porphyrin as Electrochemical Mediator, *Comptes Rendus Chimie* 21 (2018) 270-276.- I.F. = 1.798

Keynote/Invited Lectures (4):

*Presenting author

1. R. Cristescu, Antibacterial Activity of MAPLE-deposited Functionalized Flavonoid-Biopolymer Composite Thin Films, EMN Istambul Meeting 2015, July 1-4, 2015, Istambul, Turkey.
2. R. Cristescu, Matrix Assisted Pulsed Laser Evaporation (MAPLE) for Biomedical Applications, July 24, 2014, National Hellenic Research Foundation, The Theoretic and Physical Chemistry Institute, Athens, Greece.
3. R. Cristescu, G. Dorcioman, C. Popescu, C. Nita, A. Visan, G. Socol, I.N. Mihailescu, D. Mihaiescu, A. Grumezescu, M. Enculescu, C. Chifiriuc, R. J. Narayan, and D. B. Chrisey, Microbial Colonization Of Biopolymeric Thin Films Containing Natural Compounds And Antibiotics Fabricated By MAPLE, European Materials Research Society (E-MRS) 2014 Spring Meeting, Symposium J: Laser interaction with advanced materials: fundamentals and applications, May 26-30, 2014, Lille (France).
4. R. Cristescu, Magnetic Thin Coatings Fabricated By MAPLE for Biological Applications, 7th International Conference on Advanced Materials, ROCAM 2012, August 28-31, 2012, Brasov, Romania.

Oral presentations (15):

* Presenting author

1. R. Cristescu, A. Visan, G. Dorcioman, G. Socol, I.N. Mihailescu, A.M. Grumezescu, M.C. Chifiriuc, R.D. Boehm, R.J. Narayan, and D.B. Chrisey, Antifungal Activity of MAPLE-Deposited Bioactive Surfaces Incorporating Different Combinations of Systemic Antifungals and Flavonoids, E-MRS 2015 Spring Meeting, Symposium CC: Laser and plasma processing for advanced applications in material science, May 11-15, 2015, Lille, France.
2. A. Visan, M. Miroiu, C. Nita, M. Socol, I. Zgura, R. Cristescu, M.C. Chifiriuc, L. Sima, F. Antohe, I.N. Mihailescu, G. Socol, MAPLE fabrication of antimicrobial coatings for medical applications, The 8th International Conference on Advanced Materials (ROCAM 2015), July 7-10, 2015, Bucharest, Romania.
3. Rodica Cristescu*, Anita Visan, Gabriel Socol, Dan E. Mihaiescu, Mariana C. Chifiriuc, Ryan D. Boehm, Roger J. Narayan, Douglas B. Chrisey, Antimicrobial activity of biopolymeric thin films containing with natural compounds and antibiotics fabricated by MAPLE, 10th International Conference on Physics of Advanced Materials, September 22-28, 2014, Iasi, Romania.
4. A. Visan, M. Miroiu, N. Stefan, C. Nita, G. Dorcioman, M. Socol, I. Zgura, O.L. Rasoga, C.S. Breazu, L. Sima, L. Ivan, A. Stanculescu, R. Cristescu, G. Socol, I.N. Mihailescu, Encapsulated lysozyme into coatings of degradable polymeric blends fabricated by different methods, International Colloquium "Physics of Materials" PM-4 November 13-14, 2014, University POLITEHNICA of Bucharest, Romania.
5. A. Visan, D. Grossin, N. Stefan, L. Duta, F.M. Miroiu, M. Sopronyi, F. Miculescu, M. Freche, C. Charvilat, O. Marsan, S. Ciuca, I.N. Mihailescu, Matrix Assisted Pulsed Laser Evaporation synthesis of biomimetic nanocrystalline apatite coatings with applications in medicine, International Conference "MODERN LASER APPLICATIONS" Fourth Edition, 19-23 Mai, 2014, Bran, Romania.
6. A. Visan, A.C. Popescu, G.E. Stan, L. Duta, G. Dorcioman, O. Iordache, I. Dumitrescu, I. Pasuk, I.N. Mihailescu, ZnO and hydrophobin thin coatings on textiles substrates for biomedical applications, INERA WORKSHOP: Transition Metal Oxide Thin Films-functional Layers in "Smart windows" and Water Splitting devices: Technology and Optoelectronic properties, September 4th – 6th, 2014, Varna, Bulgaria.

7. R. Cristescu, C. Popescu, G. Socol, I.N. Mihailescu, D. Mihaiescu, A.M. Grumezescu, D. Tamas, M. Enculescu, R. Damian, C. Ghica, C. Chifiriuc, C. Bleotu, and D.B. Chrisey, Magnetic Silica Thin Films Fabricated By MAPLE For Targeted Drug Delivery, E-MRS 2012 Spring Meeting, Symposium G : Functional Biomaterials, May 14-18, 2012, Strasbourg (France).
8. R. Cristescu, E. Axente, S. Grigorescu, G. Dorcioman, G. Popescu-Pelin, I.N. Mihailescu, A.M. Forsea, M. Lupu, I. Stamatina, and D.B. Chrisey, Engineering the Cellular Niche using Laser Direct Writing, EMRS 2012 Spring Meeting, Symposium G : Functional Biomaterials, May 14-18, 2012, Strasbourg (France).
9. R. Cristescu*, E. Axente, S. Grigorescu, G. Dorcioman, I.N. Mihailescu, A.M. Forsea, M. Lupu, I. Stamatina and D.B. Chrisey, Engineering The Cellular Niche Using Biopolymer Patterns On Differentially Adherent Substrates, International Conference on Advanced Laser Technologies (ALT 12), September 2-6, 2012, Thun, Switzerland.
10. C. Popescu, R. Cristescu, I.N. Mihailescu, M. Jelinek, D.B. Chrisey, Functionalized Thin Films Of Biopolymers Synthesized by MAPLE for Drug Delivery Applications, International Conference "Micro- to Nano-Photonics- ROMOPTO 2012", September 3-6, 2012, Bucharest, Romania.
11. R. Cristescu, E. Axente, F. Sima, G. Dorcioman, C. Nita, I.N. Mihailescu, and D.B. Chrisey, Tailoring The Cellular Niche By Biopolymer Patterns On Differentially Adherent Acceptors, E-MRS 2013 Spring Meeting, Symposium R : Nano-engineered bioactive interfaces, May 27-31, 2013, Strasbourg (France).
12. A. Visan, C. Nita, M. Miroiu, R. Cristescu, G. Socol, N. Stefan, F. Sima, G. Dorcioman, N. Serban, M. Socol, L. Sima, C.R. Luculescu, A. Stanculescu, I.N. Mihailescu, Matrix Assisted Pulsed Laser Evaporation of Polycaprolactone-Polyethylene Glycol Coatings for Tissue Engineering Applications, Bucharest University Faculty of Physics 2013 Meeting, Section: Optics, Spectroscopy, Plasma and Lasers, June 21, 2013, Bucharest, Romania.
13. A. Visan, D. Grossin, N. Stefan, L. Duta, F.M. Miroiu, M. Sopronyi, F. Miculescu, M. Freche, C. Charvilat, O. Marsan, S. Ciuca, I.N. Mihailescu, Biomimetic nanocrystalline apatite coatings synthesized by Matrix Assisted Pulsed Laser Evaporation for medical applications, The 25th Symposium and Annual Meeting of the International Society for Ceramics in Medicine (BIOCERAMICS25), 07-10 November, 2013, Bucharest, Romania.
14. A. Visan, D. Grossin, N. Stefan, L. Duta, F. M. Miroiu, M. Sopronyi, F. Miculescu, M. Freche, C. Charvilat, O. Marsan, S. Ciuca, I. N. Mihailescu, Biomimetic Nanocrystalline Apatite Coatings Synthesized By Matrix Assisted Pulsed Laser Evaporation For Medical Applications, 10th International Student Conference of the Balkan Physical Union, September 3-5, 2013, Istanbul, Turkey.
15. F. Miroiu, G. Socol, N. Stefan, A. Visan, C. Nita, R. Cristescu, F. Sima, V. Grumezescu, M. Socol, I. Zgura, O. Rasoga, L. Sima, I. N. Mihailescu, Silk Fibroin – Based Composite Biodegradable Polymer Coatings For Biomedical Applications, 10th International Student Conference of the Balkan Physical Union, September 3-5, 2013, Istanbul, Turkey.

Poster presentation (42):

1. I. Negut, R. Cristescu, V. Grumezescu, G. Socol, A.M. Holban, R. Trusca, F. Iordache, M.C. Chifiriuc, R. Narayan, D.B. Chrisey, Isoflavonoid-based Thin Coatings Fabricated by MAPLE For Improved Antimicrobial Resistance, 5th International Colloquium "Physics of Materials" (PM 5), November 10-11, 2016, Bucharest, Romania.
2. R. Cristescu*, V. Grumezescu, G. Socol, A.M. Holban, R. Trusca, F. Iordache, M.C.Chifiriuc, R. Narayan, D.B.Chrisey, Isoflavonoid Thin Films Fabricated By MAPLE for Improved Resistance of Biomedical Surfaces to Microbial Colonization, 10th International Conference on Photoexcited Processes and Applications (ICPEPA-10), August 29 – September 2, 2016, Braşov, Romania.
3. V. Grumezescu, E. Andronescu, A.M. Grumezescu, L. Sima, F. Safciuc, F. Antohe, A.M. Holban, M.C. Chifiriuc, G. Socol, Broad spectrum anti-microbial thin coatings for titanium implants obtained by laser deposition of P(3HB-3HV)/Lys spheres, 26th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID, April 9- 12, 2016, Amsterdam, Netherlands.

4. D. Istrati, R. Cristescu, G. Dorcioman, C. Popescu, G. Socol, M.C. Chifiriuc, C. Bleotu, A.M. Grumezescu, B. Vasile, G. Voicu A. Fudulu, D.E. Mihaiescu, R. Narayan, and D.B. Chrisey, Multifunctional core-shell Fe₃O₄ nanoparticle thin films with antimicrobial activity for biomedical applications, E-MRS Spring Meeting 2016, Symposium R: Multifunctional nanostructures for diagnostic and therapeutic of diseases May 2-6, 2016 Lille, France.
5. Alina Maria Holban, Rodica Cristescu, Valentina Grumezescu, Crina Saviuc, Lia Mara Ditu, Carmen Curutiu, Alexandru Grumezescu, Mariana Carmen Chifiriuc, Veronica Lazar Iron oxide nanoparticles functionalized with limonene reduce the resistance and biofilm formation of *Pseudomonas aeruginosa*., E-MRS Spring Meeting 2016, Symposium R: Multifunctional nanostructures for diagnostic and therapeutic of diseases May 2-6, 2016 Lille, France.
6. Grumezescu, R. Cristescu, A.M. Holban, M.C. Chifiriuc, A.M. Grumezescu, R. Trusca, F. Iordache, G. Socol, MAPLE fabricated thin films based on functionalized magnetite nanoparticles embedded into poly(lactic-co-glycolic acid) spheres with improved resistance to microbial colonization, E-MRS Spring Meeting 2016, Symposium C: Laser-material interactions for tailoring future applications, May 2-6, 2016 Lille, France.
7. A. Visan, R. Cristescu, M. Miroiu, C. Nita, G. Dorcioman, N. Stefan, C. Luculescu, M. Socol, O. Rasoga, I. Zgura, C. Breazu, I. Iordache, A. Stanculescu, M.C. Chifiriuc, L. Sima, I.N. Mihailescu, G. Socol, Muramidase embedded into degradable polymers blends for antimicrobial applications, E-MRS Spring Meeting 2016, Symposium C: Laser-material interactions for tailoring future applications, May 2-6, 2016 Lille, France.
8. R. Cristescu, A. Visan, G. Socol, A.M. Grumezescu, M.C. Chifiriuc, D. Mihaiescu, R.D. Boehm, D. Yamaleyeva, M. Taylor, R.J. Narayan, D.B. Chrisey. Antimicrobial biopolymeric composites containing flavonoids and silver nanoparticles, 31st European Conference on Surface Science (ECOSS-31) 2015 August 30 - September 5, 2015, Barcelona, Spain.
9. F.M. Miroiu, N. Stefan, A.I. Visan, C. Nita, C.R. Luculescu, O. Rasoga, M. Socol, I. Zgura, R. Cristescu, D. Craciun, G. Socol, Composite biodegradable biopolymer coatings of Silk Fibroin – Poly(3-Hydroxybutyric-acid-co- 3-Hydroxyvaleric-acid) for biomedical applications, 11th Intl. Conference on Optics “Micro- to Nano-Photonics IV” (ROMOPTO 2015), September 1-4, 2015, Bucharest, Romania.
10. A. Visan, G. Socol, M. Miroiu, N. Stefan, C. Nita, G. Dorcioman, I. Zgura, O.L. Rasoga, C. Breazu, I. Urzica, L. Sima, L. Ivan, C. Cotrut, R. Cristescu, C.R. Luculescu, A. Stanculescu, I.N. Mihailescu, In Vitro Evaluation Of Embedded Lysozyme Into Degradable PEG/PCL Coatings, E-MRS 2015 Spring Meeting, Symposium CC: Laser and plasma processing for advanced applications in material science, May 11-15, 2015, Lille, France.
11. G. Popescu-Pelin, E. Axente, F. Sima, I. Iordache, C. Nita, A. Visan, I. Zgura, O.L. Rasoga, C.S. Breazu, A. Stanculescu, M. Chiritoiu, L. Sima, F. Antohe, L. Ivan, I.N. Mihailescu, G. Socol, Deposition of degradable polymeric coatings based on lysozyme embedded into poly(ϵ -caprolactone)/poly(lactic acid-co-glycolic acid) blends, E-MRS 2015 Spring Meeting, Symposium CC: Laser and plasma processing for advanced applications in material science, May 11-15, 2015, Lille, France.
12. C. Nita, A. Visan, E. Axente, O. Rasoga, R. Cristescu, N. Stefan, M. Miroiu, G. Dorcioman, I. Zgura, C.S. Breazu, M. Chiritoiu, L. Sima, G. Socol, Characterization and deposition of lysozyme embedded into degradable coatings based on PLA/PCL blends, E-MRS 2015 Spring Meeting, Symposium CC: Laser and plasma processing for advanced applications in material science, May 11-15, 2015, Lille, France.
13. G. Popescu-Pelin, E. Axente, F. Sima, C. Nita, A. Visan, I. Zgura, O.L. Rasoga, C.S. Breazu, A. Stanculescu, M. Chiritoiu, L. Sima, S. Antohe, L. Ivan, G. Socol, I.N. Mihailescu, Comparative Study On The Deposition Of Degradable Polymeric Coatings Based On Lysozyme Embedded Into PCL/PLGA Blends, The 8th International Conference On Advanced Materials: ROCAM 2015, 7-10 July 2015, Bucharest, Romania.
14. A. Visan, N. Stefan, M. Miroiu, C. Nita, G. Dorcioman, O. Rasoga, I. Zgura, C. Breazu, A. Stanculescu, R. Cristescu, M.C. Chifiriuc, M. Chiritoiu, L. Sima, F. Antohe, L. Ivan, G. Socol, I.N. Mihailescu, Antimicrobial evaluation of embedded lysozyme into degradable PEG/PCL coatings, Smart Engineering of New Materials, June 23-25, 2015, Lodz, Poland.

15. A. Visan, M. Miroiu, N. Stefan, C. Nita, G. Dorcioman, I. Zgura, O.L. Rasoga, C.S. Breazu, Iuliana Urzica, L. Sima, L. Ivan, A. Stanculescu, R. Cristescu, G. Socol, I.N. Mihailescu, Fabrication of embedded lysozyme into degradable polycaprolactone -polyethylene glycol coatings, E-MRS 2014 FALL MEETING, September 15-19, 2014, Warsaw University of Technology, Poland.
16. A. Visan, N. Stefan, M. Miroiu, C. Nita, G. Dorcioman, I. Zgura, O.L. Rasoga, C.S. Breazu, A. Stanculescu, R. Cristescu, Comparative study on MAPLE and Dip Coating techniques for fabrication of biodegradable polymer thin films with medical applications, 10th International Conference on Physics of Advanced Materials, September 22-28, 2014, Iasi, Romania.
17. N. Stefan, F. Miroiu, A. Visan, C. Nita, I. Zgura, O. Rasoga, R. Cristescu, G. Socol, Fabrication of biodegradable silk fibroin - poly(sebacic acid) diacetoxyl terminated composite coatings for local proteins release, International Student Conference on Photonics 2014, September 23-26, 2014, Orastie, Hunedoara, Romania.
18. A. Visan, M. Miroiu, N. Stefan, C. Nita, G. Dorcioman, I. Zgura, O.L. Rasoga, C.S. Breazu, I. Urzica, L. Sima, L. Ivan, A. Stanculescu, R. Cristescu, G. Socol, I.N. Mihailescu, Embedded lysozyme into degradable polycaprolactone -polyethylene glycol coatings fabricated by Matrix Assisted Pulsed Laser Evaporation and Dip Coating Techniques, International Student Conference on Photonics 2014, September 23-26, 2014, Orastie, Hunedoara, Romania.
19. F. Miroiu, N. Stefan, A. Visan, C. Nita, R. Cristescu, I. Zgura, O. Rasoga, L. Sima, I.N. Mihailescu, G. Socol, Silk Fibroin – poly(3-hydroxybutyric-acid-co-3-hydroxyvaleric-acid) composite biodegradable polymer coatings for biomedical applications, International Student Conference on Photonics 2014, September 23-26, 2014, Orastie, Hunedoara, Romania.
20. R. Cristescu, V. Grumezescu, A.M. Holban, B.S. Vasile, L. Mogoanta, G.D. Mogosanu, A.M. Grumezescu, G. Socol, I.N. Mihailescu, A. Fica, R. Trusca, F. Iordache, and D.B. Chrisey, MAPLE-Fabricated Thin Films Composed of 5 Nm Antibiotics Functionalized Magnetite Nanostructures with Anti-Pathogenic Properties, European Materials Research Society (E-MRS) 2014 Spring Meeting, Symposium J : Laser interaction with advanced materials: fundamentals and applications, May 26-30, 2014, Lille (France).
21. A. Visan, M. Miroiu, N. Stefan, C. Nita, G. Dorcioman, I. Zgura, O.L. Rasoga, C.S. Breazu, A. Stanculescu, R. Cristescu, G. Socol, I.N. Mihailescu, Fabrication of biodegradable polycaprolactone -polyethylene glycol composite coatings by Matrix Assisted Pulsed Laser Evaporation and Dip Coatings, European Materials Research Society (E-MRS) 2014 Spring Meeting, Symposium J : Laser interaction with advanced materials: fundamentals and applications, May 26-30, 2014, Lille (France). _Best poster award.
22. A.M. Grumezescu, A.M. Holban, G. Socol, B.S. Vasile, R. Cristescu, V. Grumezescu, D. Fica, A. Fica, R. Trusca, E. Grosu, F. Iordache, Fabrication and characterization of functionalized surfaces with silicon polymer films for anti-infective therapy applications, European Materials Research Society (E-MRS) 2014 Spring Meeting, Symposium J : Laser interaction with advanced materials: fundamentals and applications, May 26-30, 2014, Lille (France).
23. M. Miroiu, N. Stefan, A. Visan, O.L. Rasoga, I. Zgura, C. Nita, A. Stanculescu, G. Dorcioman, R. Cristescu, I.N. Mihailescu, G. Socol, Biodegradable Silk Fibroin/Poly(3-Hydroxy-Butyric Acid-Co-3-Hydroxy-Valeric Acid) composite coatings obtained by MAPLE and dip-coating methods, European Materials Research Society (E-MRS) 2014 Spring Meeting, Symposium J : Laser interaction with advanced materials: fundamentals and applications, May 26-30, 2014, Lille (France).
24. A. Visan, M. Miroiu, N. Stefan, C. Nita, G. Dorcioman, I. Zgura, O.L. Rasoga, C.S. Breazu, A. Stanculescu, R. Cristescu, G. Socol, I.N. Mihailescu, Matrix Assisted Pulsed Laser Evaporation vs. Dip Coating techniques for fabrication of biodegradable polymer thin films with medical applications, International Conference "MODERN LASER APPLICATIONS" Fourth Edition, 19-23 Mai, 2014, Bran, Romania.
25. N. Stefan, M. Miroiu, A. Visan, O.L. Rasoga, I. Zgura, A. Stanculescu, G. Socol, Biodegradable silk fibroin/poly(sebacic acid) diacetoxyl terminated composite coatings obtained by matrix assisted pulsed

laser evaporation, International Conference "MODERN LASER APPLICATIONS" Fourth Edition, 19-23 Mai, Bran, Romania.

26. A. Visan, D. Grossin, N. Stefan, L. Duta, M. Miroiu, G.E. Stan, M. Sopronyi, C. Luculescu, M. Freche, O. Marsan, C. Charvilat, S. Ciuca, I.N. Mihailescu, Matrix Assisted Pulsed Laser Evaporation synthesis of biomimetic nanocrystalline apatite coatings for biomedical applications, European Materials Research Society (E-MRS) 2014 Spring Meeting, Symposium J : Laser interaction with advanced materials: fundamentals and applications, May 26-30, 2014, Lille (France).

27. A. Visan, A.C. Popescu, G.E. Stan, L. Duta, G. Dorcioman, O. Iordache, I. Dumitrescu, I. Pasuk, I.N. Mihailescu, ZnO and hydrophobin thin coatings on textiles substrates for biomedical applications, INERAWORKSHOP: Transition Metal Oxide Thin Films-functional Layers in "Smart windows" and Water Splitting devices: Technology and Optoelectronic properties, September 4th – 6th, 2014, Varna, Bulgaria. -Best poster award.

28. R. Cristescu, C. Popescu, G. Dorcioman, M. Miroiu, G. Socol, I.N. Mihailescu, D. Mihaiescu, A. Grumezescu, M. Enculescu, C. Chifiriuc, P.R. Miller, R. D. Boehm, R.J. Narayan, and D.B. Chrisey, Antimicrobial Activity of Flavonoid-Biopolymer–Antibiotic Thin Films Fabricated By Advanced Pulsed Laser Methods, European Materials Research Society (E-MRS) Spring Meeting, Symposium V : Laser materials processing for micro and nano applications, May 14-18 2012, Strasbourg (France). – Poster presentation.

29. R. Cristescu, G. Dorcioman, G. Socol, I.N. Mihailescu, D. Mihaiescu, A. Grumezescu, M. Enculescu, C. Chifiriuc, R. D. Boehm, R. J. Narayan, D. B. Chrisey, Antimicrobial Activity Of Flavonoid- Biopolymer – Antibiotic Thin Films Fabricated By Advanced Pulsed Laser Methods, E-MRS 2013 Spring Meeting, Symposium R : Nano-engineered bioactive interfaces, May 27-31, 2013, Strasbourg (France). – Poster presentation.

30. R. Cristescu, C. Popescu, A. Popescu, I.N. Mihailescu, A.A. Ciucu, A. Balan, S. Iordache, I. Stamatina, E. Fagadar-Cosma, and D.B. Chrisey, Novel Nanostructured Porphyrin Conjugate Thin Films Deposited By MAPLE, E-MRS 2012 Spring Meeting, Symposium V : Laser materials processing for micro and nano applications, May 14-18, 2012, Strasbourg (France).

31. G. Socol, L.E. Sima, C.R. Luculescu, M. Enculescu, M. Socol, M. Miroiu, N. Preda, A. Stanculescu, F. Sima, R. Cristescu, S.M. Petrescu, I.N. Mihailescu, Combinatorial pulsed laser deposition of calcium phosphates, E-MRS 2012 Spring Meeting, Symposium V : Laser materials processing for micro and nano applications, May 14-18, 2012, Strasbourg (France).

32. C. Popescu, A.C. Popescu, R. Cristescu, I. Iordache, D. Mihaiescu, D. Tamas, C. Ghica, Polymeric shell magnetic nanoparticles for localized drug delivery, E-MRS 2012 Spring Meeting, Symposium P : Advanced Hybrid Materials II: design and applications, May 14-18, 2012, Strasbourg (France).

33. R. Cristescu, A. Popescu, C. Popescu, V. Grumezescu, I. N. Mihailescu, A.A. Ciucu, A. Balan, S. Iordache, I. Stamatina, E. Fagadar-Cosma, D.B. Chrisey, Novel Meso-Phenyl Unsymmetrical Substituted Porphyrin Thin Films Deposited By MAPLE, E-MRS 2013 Spring Meeting, Symposium O : Synthesis, processing and characterization of nanoscale multi functional oxide films IV, May 27-31, 2013, Strasbourg (France).

34. R. Cristescu, G. Dorcioman, C. Popescu, G. Socol, I.N. Mihailescu, D. Mihaiescu, A. Grumezescu, M. Enculescu, C. Chifiriuc, C. Bleotu, D. B. Chrisey, Iron-Oxide Core/Shell/Adsorption-Shell Nanoparticle Thin Coatings Fabricated By MAPLE For Biological Applications, E-MRS 2013 Spring Meeting, Symposium U : Design of multifunctional nano-objects for biomedical applications, May 27-31, 2013, Strasbourg (France).

35. A. Visan, M. Miroiu, C. Nita, R. Cristescu, G. Socol, N. Stefan, F. Sima, G. Dorcioman, N. Serban, M. Socol, L. Sima, C.R. Luculescu, A. Stanculescu, I.N. Mihailescu, Characteristics and Biodegradation Properties of Polycaprolactone -Polyethylene Glycol Coatings for Tissue Engineering Applications, International Conference Modern Laser Applications Third Edition (INDLAS 2013), 20-24 May 2013 Bran, Romania.

36. A. Visan, D. Grossin, N. Stefan, L. Duta, F.M. Miroiu, M. Sopronyi, F. Miculescu, M. Freche, C. Charvilat, O. Marsan, S. Ciuca, I.N. Mihailescu, Biomimetic Nanocrystalline Apatite Coatings Synthesized by Matrix

Assisted Pulsed Laser Evaporation For Medical Applications, International Conference Modern Laser Applications Third Edition (INDLAS 2013), 20-24 May 2013 Bran, Romania.

37. A. Visan, M. Miroiu, R. Cristescu, G. Socol, N. Stefan, G. Dorcioman, F. Sima, N. Serban, C. Nita, M. Socol, L. Sima, C.R. Luculescu, A. Stanculescu, I.N. Mihailescu, Characteristics and Biodegradation Properties of Polycaprolactone -Polyethylene Glycol Coatings for Tissue Engineering Applications, E-MRS 2013 Spring Meeting, Symposium V : Laser materials interactions for micro and nano applications, May 27-31, 2013, Strasbourg (France).

38. A. Visan, M. Miroiu, C. Nita, R. Cristescu, G. Socol, N. Stefan, G. Dorcioman, N. Serban, M. Socol, I. Zgura, O.L. Rasoga, C. Breazu, L. Sima, C.R. Luculescu, A. Stanculescu, I.N. Mihailescu, Characteristics and biodegradation properties of polycaprolactone -polyethylene glycol coatings for tissue engineering applications, The 13th International Balkan Workshop on Applied Physics and Materials Science, July 4-6 2013, Ovidius University of Constanta, Constanta, Romania.

39. A. Visan, D. Grossin, N. Stefan, L. Duta, F.M. Miroiu, M. Sopronyi, F. Miculescu, M. Freche, C. Charvilat, O. Marsan, S. Ciuca, I.N. Mihailescu, Biomimetic nanocrystalline apatite coatings synthesized by Matrix Assisted Pulsed Laser Evaporation for medical applications, The 13th International Balkan Workshop on Applied Physics and Materials Science, July 4-6 2013, Ovidius University of Constanta, Constanta, Romania.

40. N. Stefan, F.M. Miroiu, R. Cristescu, A. Visan, V. Grumezescu, C. Nita, M. Socol, O. Rasoga, L. Sima, I.N. Mihailescu, G. Socol, Fabrication Of Biodegradable Silk Fibroin - Poly(Sebacic Acid) Diacetoxo Terminated Composite Coatings For Local Release Of Proteins, E-MRS 2013 Spring Meeting, Symposium V : Laser materials interactions for micro and nano applications, May 27-31, 2013, Strasbourg (France).

41. F. Miroiu, G. Socol, N. Stefan, A. Visan, C. Nita, R. Cristescu, F. Sima, V. Grumezescu, M. Socol, I. Zgura, O. Rasoga, L. Sima, I. N. Mihailescu, Silk Fibroin – Based Composite Biodegradable Polymer Coatings For Biomedical Applications, E-MRS 2013 Spring Meeting, Symposium V : Laser materials interactions for micro and nano applications, May 27-31, 2013, Strasbourg (France).

42. N. Stefan, F.M. Miroiu, R. Cristescu, A. Visan, V. Grumezescu, C. Nita, M. Socol, O. Rasoga, L. Sima, I.N. Mihailescu, G. Socol, Fabrication Of Biodegradable Silk Fibroin - Poly(Sebacic Acid) Diacetoxo Terminated Composite Coatings For Local Release Of Proteins, 10th International Student Conference of the Balkan Physical Union, September 3-5, 2013, Istanbul, Turkey.

(ix) partners (if the case). Collaborations:

1. Douglas B. Chrisey, Tulane University USA
2. Roger J. Narayan, University of North Carolina USA
3. Mariana Carmen Chifiriuc, University of Bucharest, Romania
4. Dan Eduard Mihaiescu, National University of Science and Technology POLITEHNICA Bucharest, Romania

Rodica Cristescu_Innovative multifunctional nanoparticle-mediated delivery of antimicrobial peptide for improved performance of medical implants_BIOMATE_PN-III-P4-ID-PCE-2016-0884

(i) project title: Innovative multifunctional nanoparticle-mediated delivery of antimicrobial peptide for improved performance of medical implants

(ii) acronym: BIOMATE

(iii) principal investigator: Rodica Cristescu

(iv) project code: PN-III-P4-ID-PCE-2016-0884 (Contract 42/2017)

(v) implementation duration: 2017-2019

(vi) project resume:

Antimicrobial agents have dramatically reduced the number of deaths from infectious diseases since their introduction 70 years ago. However, through overuse and misuse, many micro-organisms have become resistant to them. Antimicrobial peptides (AMP) are gaining increasing interest as potential therapeutics due to their ability to kill antibiotic-resistant bacteria and their potential as antibiofilm agents. Since AMPs target bacterial membranes, it will likely be difficult for microorganisms to develop resistance to AMPs. In this Project, we will use antimicrobial peptides nanoencapsulated in mesoporous biopolymeric/magnetic nanoparticle composites materials. The nanovectors will be delivered to implant surfaces as thin coatings via laser light, using a deposition technique called MAPLE (Matrix Assisted Pulsed Laser Evaporation). The deposited nanoparticle layers will be thoroughly investigated by AFM (surface roughness of coatings, surface parameters, 3D surface profiles), SEM (particles shape, coalescence, diameter assessment), TEM (biopolymer crystallinity, visualization of composing layers), XRD (crystallinity of composing elements), FTIR (comparison of functional peaks from both targets and coatings spectra) and adherence tests at the substrate-nanocoating interfaces. The antimicrobial activity will be assessed on planktonic and biofilm embedded in Gram-negative rods pathogens. Biocompatibility and antibacterial efficiency of nanovectors will be tested in a final in vivo step on white holoxenic mice.

(vii) objectives:

Selection of the best combination of antimicrobial peptides and large spectrum antibiotics; Synthesis and evaluation of antimicrobial peptides nanoencapsulated in mesoporous biopolymeric/magnetic nanoparticle nanocomposites materials; MAPLE-deposition of nanocomposite coatings onto different substrates by pulsed excimer laser; Characterization of MAPLE-deposited functionalized antimicrobial peptides nanoencapsulated in mesoporous biopolymeric/magnetic nanoparticle nanocomposite nanostructures by complementary investigations techniques; In vitro and in vivo assessment of the biological performances of the obtained nanocoatings, in term of biocompatibility and antimicrobial activity.

(viii) list of dissemination and communication list:

ISI Peer-reviewed research publications (14):

*Corresponding author

1. I. Negut, A.I. Visan, C.E. Popescu, R. Cristescu, A. Ficai, A.M. Grumezescu, M.C. Chifiriuc, R.D. Boehm, D. Yamaleyeva, M. Taylor, R.J. Narayan, and D.B. Chrisey, Successful release of voriconazole and flavonoids from MAPLE deposited bioactive surfaces, Applied Sciences 9(4) (2019) 786.

2. A.I. Visan, G. Popescu-Pelin, O. Gherasim, V. Grumezescu, M. Socol, I. Zgura, C. Florica, R.C. Popescu, D. Savu, A.M. Holban, R. Cristescu, C.E. Matei, G. Socol, Laser Processed Antimicrobial Nanocomposite Based on Polyaniline Grafted Lignin Loaded with Gentamicin-Functionalized Magnetite, *Polymers* 11 (2019) 283.
3. Alina Morosan, Dan Eduard Mihaiescu, Daniela Istrati, Georgeta Voicu, Mihai Radu, Anamaria Hanganu, Raluca Stan, Functionalized silica shell magnetic nanoparticles for nanophase peptide synthesis applications, *Microporous and Mesoporous Materials* 286 (2019) 45-56.
4. A. Ibraheem, H.A. Kadhemi, S.A. Hadeethi, M.S. Jabir, Raluca Grigore, Marcela Popa, Irina Gheorghe, Mihaiescu Dan Florin, Effects of silver nanoparticles on nosocomial *Pseudomonas aeruginosa* strains – an alternative approach for antimicrobial therapy, *Romanian Biotechnological Letters* 24(2) (2019) 286-293.
5. Roger Sachan, Panupong Jaipan, Jennifer Y Zhang, Simone Degan, Detlev Erdmann, Jonathan Tedesco, Lyndsi Vanderwal, Shane J Stafslie, Irina Negut, Anita Visan, Gabriela Dorcioman, Gabriel Socol, Rodica Cristescu, Douglas B Chrisey, Roger J Narayan, Printing amphotericin B on microneedles using matrix-assisted pulsed laser evaporation, *International Journal of Bioprinting* 3(2) (2017) 147-157.
6. Cristian Ravariu, Daniela Istrati, Dan Mihaiescu, Alina Morosan, Bogdan Purcareanu, Rodica Cristescu, Bogdan Vasile, Solution for green organic thin film transistors: Fe₃O₄ nano-core with PABA external shell as p-type film, *Journal of Materials Science: Materials in Electronics* 31 (2020) 3063–3073.
7. Rodica Cristescu, Irina Negut, Anita Ioana Visan, Alexander K. Nguyen, Andrew Sachan, Peter L. Goering, Douglas B. Chrisey, Roger J. Narayan, Matrix assisted pulsed-laser evaporation-deposited rapamycin coatings maintain anti-proliferative activity, *International Journal of Bioprinting* 6(1) (2020) 105-111.
8. Bin Zhang, Rodica Cristescu, Douglas B. Chrisey, Roger J. Narayan, Solvent-based extrusion 3D printing for the fabrication of tissue engineering scaffolds, *International Journal of Bioprinting* 6(1) (2020) 28-42.
9. Anita Visan, Gianina Popescu-Pelin, Oana Gherasim, Andreea Mihaiescu, Marcela Socol, Irina Zgura, Mari Chiritoiu, Livia Elena Sima, Felicia Antohe, Luminita Radulescu, Diana Vranceanu, Cosmin Cotrut, Rodica Cristescu, G. Socol, Long-term evaluation of dip-coated PCL/PEG coatings in simulated conditions, *Polymers* 12(3) (2020) 717.
10. G. Gradisteanu Pircalabioru, L.I. Popa, L. Marutescu, I. Gheorghe, M. Popa, I. Czobor Barbu, R. Cristescu*, M.-C. Chifiriuc, Bacteriocins in the Era of Antibiotic Resistance: Rising to the Challenge, *Pharmaceutics* 13(2) (2021) 196.
11. V. Grumezescu, I. Negut, R. Cristescu*, A.M. Grumezescu, A.M. Holban, F. Iordache, M.C. Chifiriuc, R.J. Narayan, D.B. Chrisey, Isoflavonoid-Antibiotic Thin Films Fabricated by MAPLE for Improved Resistance to Microbial Colonization, *Molecules* 26(12) (2021) 3634. MOLECULES26123634 (invited paper)
12. D.E. Mihaiescu, D. Istrati, A. Morosan, M. Stanca, B. Purcareanu, **R. Cristescu**, B.S. Vasile, R.D. Trusca. Low Release Study of Cefotaxime by Functionalized Mesoporous Silica Nanomaterials, *Gels* 8(11) (2022) 711.
13. C.E. Matei, A.I. Visan, R. Cristescu*, Aloe Vera Polysaccharides as Therapeutic Agents: Benefits Versus Side Effects in Biomedical Applications, *Polysaccharides* 6(2) (2025) 36
14. R. Cristescu*, I. Negut, A. Visan, C.E. Popescu, G. Dorcioman, C. Matei, A. Morosan, D. Istrati, D.E. Mihaiescu, M. Popa, C.M. Chifiriuc, R. Narayan, D.B. Chrisey, Innovative multifunctional nanoparticle-mediated delivery of antimicrobial peptide for improved performance of medical implants, In preparation to be submitted to high impact ISI journal.

Keynote/Invited Lectures (4):

*Presenting author

1. Rodica Cristescu*, Advanced Laser Processing for Microbiology Applications, International Summit on Microbiology and Parasitology (ISMP-2018), October 25-27, 2018, Prague, Czech Republic.
2. R. Cristescu*, A.I. Visan, C.M. Chifiriuc, R. Narayan, D.B. Chrisey, Bioactive composite nanocoatings of antimicrobial peptides fabricated by advanced laser processing with enhanced anti-superbug efficiency, The 15th International Conference on Physics of Advanced Materials (ICPAM-15), November 19-26, 2023, Sharm El Sheikh, Egypt.

3. R. Cristescu*, A.I. Visan, R. Narayan, D.B. Chrisey, Matrix Assisted Pulsed Laser Evaporation of natural biomaterial-based thin films for biomedical applications, The 6th Autumn School Physics of Advanced Materials (PAMS-6), November 19-26, 2023, Sharm El Sheikh, Egypt.

4. Rodica Cristescu*, Anita Ioana Visan, Consuela Elena Matei, Dan Eduard Mihaiescu, Mariana Carmen Chifiriuc, Roger J. Narayan, Douglas B. Chrisey, Bioactive composite nanocoatings fabricated by advanced laser processing to target resistant superbugs, Materials Science & Technology (MS&T) Technical Meeting and Exhibition, Symposium: Next Generation Biomaterials, October 6–9, 2024, David L. Lawrence Convention Center, Pittsburgh, Pennsylvania, USA.

Oral presentations (5):

* Presenting author

1. R. Cristescu*, I. Negut, A. Visan, D. Istrati, D.E. Mihaiescu, M. Popa, M.C. Chifiriuc, R.J. Narayan, D.B. Chrisey, Laser processing of antimicrobial peptides releasing thin films for the inhibition of microbial attachment and biofilms formation on medical implants, Advanced Laser Technologies (ALT), September 15-20, 2019, Prague, Czech Republic.

2. Anita Visan*, Gianina Popescu-Pelin, Oana Gherasim, Valentina Grumezescu, Marcela Socol, Irina Zgura, Camelia Florica, Roxana C. Popescu, Diana Savu, Alina Maria Holban, Rodica Cristescu, Consuela E. Matei, Gabriel Socol, Electric field-sensitive polymers as controlled Gentamicin sulfate delivery platforms, E-MRS Spring Meeting 2019, Symposium L : New strategies for smart biointerfaces, May 27-June 1, 2019, Nice, France.

3. I. Negut, C. Popescu, G. Dorcioman, A. Popescu, R. Cristescu*, D.E. Mihaiescu, M. Popa, M.C. Chifiriuc, R.J. Narayan, D.B. Chrisey, Innovative multifunctional nanoparticle-mediated delivery of antimicrobial peptide for improved performance of medical implants, E-MRS 2018 Spring Meeting, Symposium F: Advanced biomaterials: elaboration, nanostructure, interfaces with tissues, June 18-22, 2018, Strasbourg, France.

4. I. Negut, R. Cristescu, C. Popescu, G. Dorcioman, A. Popescu, D. Mihaiescu, M. Popa, C. Chifiriuc, R.J. Narayan, D.B. Chrisey, Nanoparticle-mediated delivery of antimicrobial peptide for enhanced performance of medical implants, Prioritatile Chimiei pentru o Dezvoltare Durabila - PRIOCHEM editia XIV, October 10 – 12, 2018, Bucharest, Romania - Poster selectat pentru prezentare orala.

5. Rodica Cristescu*, Irina Gabriela Negut, Anita Ioana Visan, Gabriela Corina Dorcioman, Consuela Elena Matei, Dan Eduard Mihaiescu, Marcela Popa, Carmen Mariana Chifiriuc, Roger J. Narayan, Douglas B. Chrisey, Nanostructured composite coatings fabricated by advanced laser processing to target resistant superbugs, 2nd International Conference on Laser, Plasma, and Radiation - Science and Technology (ICLPR-ST), June 16-21, 2024, Crisan - Lebada resort, Danube Delta, Romania.

Poster presentation (10):

1. I. Negut, R. Cristescu*, C. Popescu, A. Visan, G. Dorcioman, A. Popescu, D. Istrati, D.E. Mihaiescu, M. Popa, M.C. Chifiriuc, R.J. Narayan, D.B. Chrisey, Antimicrobial peptides releasing nanocoatings for preventing microbial adhesion and biofilms formation on medical implants, E-MRS Spring Meeting 2019, Symposium L: New strategies for smart biointerfaces, May 27-June 1, 2019, Nice, France.

2. Anita Visan, Carmen Ristoscu, Gianina Popescu-Pelin, Mihai Soprony, Rodica Cristescu, Gabriel Socol, Carmen Mariana Chifiriuc, David Grossin, Fabien Brouillet, Ion N. Mihaiescu, Antimicrobial implants based on Chitosan/biomimetic apatite/tetracycline composite powders synthesized by Matrix Assisted Pulsed Laser Evaporation, E-MRS Spring Meeting 2019, Symposium L: New strategies for smart biointerfaces, May 27-June 1, 2019, Nice, France.

3. A. Visan, G. Popescu-Pelin, I. Zgura, M. Chiritoiu, L. E. Sima, Mihai Cosmin Cotrut, R. Cristescu, G. Socol, Surface functionalization with anticorrosive and antimicrobial biodegradable polymeric implants, E-MRS Spring Meeting 2019, Symposium L : New strategies for smart biointerfaces), May 27-June 1, 2019, Nice, France.

4. A. Visan, N. Mihailescu, A. Ficai, M.A. Sopronyi, G. Popescu Pelin, N.C. Mihailescu, M. Bojan, J.M.F. Ferreira, I.N. Mihailescu, Bioactive Glass on Mg/Mg alloys substrates for biodegradable, nutritious coatings of implants, E-MRS Spring Meeting 2019, Symposium V : Laser interactions with materials: from fundamentals to applications May 27-June 1, 2019, Nice, France.
5. I. Negut, R. Cristescu, C. Popescu, G. Dorcioman, A. Popescu, D. Mihaiescu, M. Popa, C. Chifiriuc, R. Narayan, D.B. Chrisey, Nanoparticle-mediated delivery of antimicrobial peptide for enhanced performance of medical implants, International Summit on Microbiology and Parasitology (ISMP-2018), October 25-26, 2018, Prague, Czech Republic.
6. A. Moroşan, D. Istrati, R.L. Stan, B. Trica, G. Vasilievici, D.E. Mihaiescu, Functionalized silica shell magnetic nanoparticles for nanophase peptide synthesis applications, 15th ICNN – NN18-NANOTECHNOLOGY 2018, July 3-6, 2018, Thessaloniki, Grecia.
7. Alina Morosan, Daniela Istrati, Laura Olariu, Bogdan Purcareanu, Bogdan Trica, Gabriel Vasilievici, Dan Eduard Mihaiescu, La Désorption des composés bioactifs à partir du corps de matrice de silice - organique, COFrRoCA 10 édition, June 27-29, 2018, Bacau, Romania.
8. D. Istrati, A. Morosan, M. Stanca, B. Purcareanu, A. Fudulu, L. Olariu, A. Buteica, I. Mindrila, R. Cristescu, D.E. Mihaiescu, Mesoporous nanocomposites for sustained release applications, ICGRBSE 2017: 19th International Conference on Growth, Regeneration, Biological Sciences and Engineering, December 04-05, 2017, Amsterdam, The Netherlands.
9. C. Popescu, A.C. Popescu, R. Cristescu, M. Kompitsas, C. Bala, Detection of Small Organic Compounds Based upon the Surface Plasmon Resonance of a Gold/ITO Structure, The 8th International Workshop on Surface Modification for Chemical and Biochemical Sensing, November 3-7, 2017, Żelechów (near Warsaw), Poland.
10. Rodica Cristescu*, Irina Negut, Anita Visan, Valentina Grumezescu, Gabriela Dorcioman, Consuela Matei, Alina Morosan, Dan Eduard Mihaiescu, Adriana Balan, Gratiela Gradisteanu, Marcela Popa, Mariana Carmen Chifiriuc, Roger J. Narayan, Douglas B. Chrisey, Multifunctional core-shell Fe_3O_4 nanoparticle thin films with antimicrobial activity for biomedical applications, International Conference on Laser, Plasma and Radiation – Science and Technology” (ICLPR-ST), June 7-10, 2022, Bucharest, Romania.

(ix) partners (if the case). Collaborations:

1. Douglas B. Chrisey, Tulane University USA
2. Roger J. Narayan, University of North Carolina USA
3. Mariana Carmen Chifiriuc, University of Bucharest, Romania
4. Dan Eduard Mihaiescu, National University of Science and Technology POLITEHNICA Bucharest, Romania