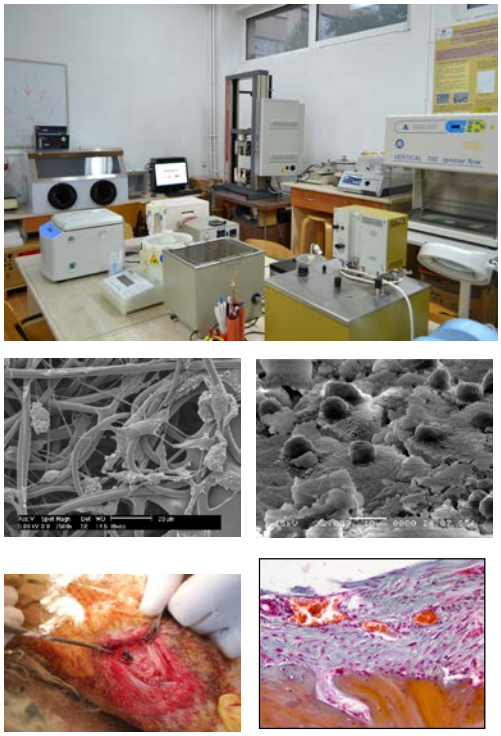
BIOMATERIALS RESEARCH GROUP

Contact details

Name	**Biomaterials Research Group**
Acronym	**BIOMAT**
Logo	BIOMAT BIOMATERIALS RESEARCH GROUP
Site	http://research.utcluj.ro/tl_files/research/Research%20Domain/Ingineria%20Materialelor/2_Catalin%20Popa.pdf
Address	103-105 Muncii Av., room C08, 400641 Cluj-Napoca
Faculty Department	**Faculty of Materials and Environmental Engineering,** **Materials Science and Engineering Department**
Telephone	+40 264 401704
Fax	+40 264 593831
Director	Prof. Dr. Eng. Cătălin Popa
e-mail	Catalin.Popa@stm.utcluj.ro



Areas of expertise

Biomaterials
Synthesis and characterization of biomaterials designed for soft / hard tissue implants; functionalization of implants surface in view of a designed body reaction; titanium-base structures with ultralow Young's modulus and / or osseintegration optimized surface.
Tissue Engineering
Synthesis and characterization of scaffolds designed for the growth of tissue from stem / primary cells; design and manufacturing of synthetic – tissue hybrid materials for grafts; synthesis of drug delivery systems / biologically active hydrogel-base microspheres.
Medical Microfluidics
Design, manufacturing and testing of microfluidic devices for cells selection.

Team

Prof. Cătălin Popa, Dr. Eng., Prof. Viorel Cândea, Dr. Eng., Sen.Lect. Codruța Pavel, Dr. Eng., Violeta Pașcalău, Dr. Eng., Gabriel Batin, Dr. Eng.

Representative projects

STEMREG – "**Hybrid composite grafts obtained through Tissue Engineering and stem cells with application in Regenerative Medicine"**, PN II Partnerships (2012 – 2016);
BIOMAPIM – "**New biocompatible materials manufactured through SLS and SLM"**, PN II Complex Ideas (2010 – 2013);
BIOINTECH – "**Application of Tissue Engineering innovative methods in the pathology of digestive tube – multidisciplinary approach"**, PN II, Partnerships (2008 – 2011;
"Neutron Reflectivity Study of the Response of Membrane Proteins in Model Bilayers to AC Fields", ISIS Beamtime Application RB720167, 2007, U.K.
"Composite biomaterials for radiotherapy and simultaneous hyperthermia", CEEX 100/2006;
"Innovative methods in the reconstructive surgery of cancer patient – composite tissue grafting and employment of biocompatible synthetic materials", CEEX 109/ 2006;
"Optimization of the management for the polytraumatised patient through therapeutic protocols of miniinvasive methods and through the use of biocompatible materials in the reconstruction of tissue or organ post-traumatic defects", CEEX 145/ 2006;
"Functionalized conjugated polymers – based nanostructures and related nanocomposites", CEEX 12/ 2005;

"Microfluidics with Electrode Integration for Blood Cells Dynamic Studies", EPSRC Grant IRC A1 B3R (IRC, Queen Mary, University of London), 2005;
"Neutron Reflection Study of the Electric Characterisation of Cells"*,* ISIS Beamtime Application RB610554, CCLRC, UK, 2005;
"Porous nanocrystalline silicon – polypyrole multi-layered materials destined to the selective dielectrophoresis of blood cells", Matnantech 208(403)/2004;
"Functionally graded biomaterials, biomimetically structured, destined to personalised endosseous implants", Matnantech 163(303)/2003;

Significant results

The most representative publications of the past 5 years:

1. A.M. Salantiu, C. Fekete, L. Muresan, P. Pascuta, F. Popa, C. Popa, *Anodic oxidation of PM porous titanium for increasing the corrosion resistance of endosseous implants*, Materials Chemistry and Physics 2015, 149-150, 453-459;
2. T. Marcu, Salantiu, A.M., I. Gligor, C. Popa, Microstructural characterization of PM Ti with dextrin addition for endosseous applications, *Journal of Optoelectronics and Advanced Materials* 2013, 15 (7-8) , 847-852;
3. I. Gligor, O. Soritau, M. Todea, C. Berce, A. Vulpoi, T. Marcu, V. Cernea, C. Popa,, Porous c.p. titanium using dextrin as space holder for endosseous implants, *Particulate Science and Technology* 2013, 31 (4), 357-36;
4. L. Cont, D. Grant, C. Scotchford, M. Todea, C. Popa, Composite PLA scaffolds reinforced with PDO fibers for tissue engineering, *Journal of Biomaterials Applications* 2013 27 (6) , 707-716;
5. T. Marcu, C. Menapace, L. Girardini, D. Leordean, C. Popa, Selective Laser Melting of Ti6Al7Nb with hydroxyapatite addition, *Journal of Rapid Prototyping*, accepted for publishing 18.01.2013;
6. T. Marcu, M. Todea, L. Maines, D. Leordean, P. Berce, C. Popa, Metallurgical and mechanical characterisation of titanium based materials for endosseous applications obtained by selective laser melting, *Powder Metallurgy 2012*, 55(4), 309-314;
7. T. Marcu, O. Nemes, M. Todea, D. Leordean, C. Popa, Characterization of Hydroxyapatite Coatings on Different Pretreated Ti6Al7Nb Alloy Substrates, *Studia Universitatis Babes-Bolyai*, Chemia 2012, 57(4), 109 – 120;
8. T. Marcu, M. Todea, I. Gligor, P. Berce, C. Popa, Effect of surface conditioning on the flowability of Ti6Al7Nb powder for selective laser melting applications, *Applied Surface Science* 2012, 258(7), 3276-3282;
9. L. Cont, V. Popescu, C. Popa, Electrospun Polystyrene in Limonene Fibrous Structures for Medical Applications, *Materiale Plastice* 2011, 48(3), 251 – 254;
10. M. Todea, T. Marcu, M. Tamasan, S. Simon, C. Popa, The influence of some synthesis conditions on the structure of calcium phosphate powders, *Studia Universitatis Babes-Bolyai Chemia* September 2011, Issue 3, 147-156;
11. I. Gligor, T. Marcu, V. Candea, C. Popa, Surface conditioning of porous titanium for endosseous implants by chemical and heat treatments, *Journal of Optoelectronics and Advanced Materials* 2011, 13(7), 879-882;

Significant solutions:
Design – synthesis – characterisation of controlled porosity PM titanium for endosseous implants;
Functionalization of titanium implants for enhancing osseointegration;
Functionalization of surgical instruments for low halo effect;
Functionalization of surgical meshes in view of controlled tissue adhesion;
Design – synthesis – characterisation of biodegradable polymers scaffolds for culturing cells / organelles;
Design - synthesis of delivery systems for active agents in Tissue Engineering and wound healing;
Design, manufacturing and testing of microfluidic devices for the selection of blood cells.
Technologies:
PM processing of titanium and titanium – base alloys;
Synthesis of drug / active factors containing microspheres;
Electrospinning of composite structures;
Sol-gel coating and surface conditioning of metallic biomaterials;
Patents:
C. Popa, L. Cont, G. Dindelegan, V. Simon, I. Brie, C. Pavel, V. Candea – Method for the manufacturing of scaffolds and composite materials destined to Tissue Engineering, RO patent Nr. 127534;

The offer addressed to the economic environment

Research & development	Design and synthesis of new bioactive or hybrid materials for implants / grafts; Development of application designed complex structures for medical accessories: dental and maxillary-facial implants, orthopedic implants, "wound dressing", personalized medical instruments, surgical clips and staples; Development of new 3D scaffolds for the seeding of stem / primary cells / organelles in view of growing tissue / organ grafts; Development of new drug delivery systems with applications in Tissue Engineering, wound healing, diabetes, postoperative therapy; Development of microfluidic devices for the active selection / separation of live cells;
Consulting	Improvement of constructive / technologic design for dental, maxillary-facial and orthopedic implants; consultancy in the field of materials and technologies for surgical units.