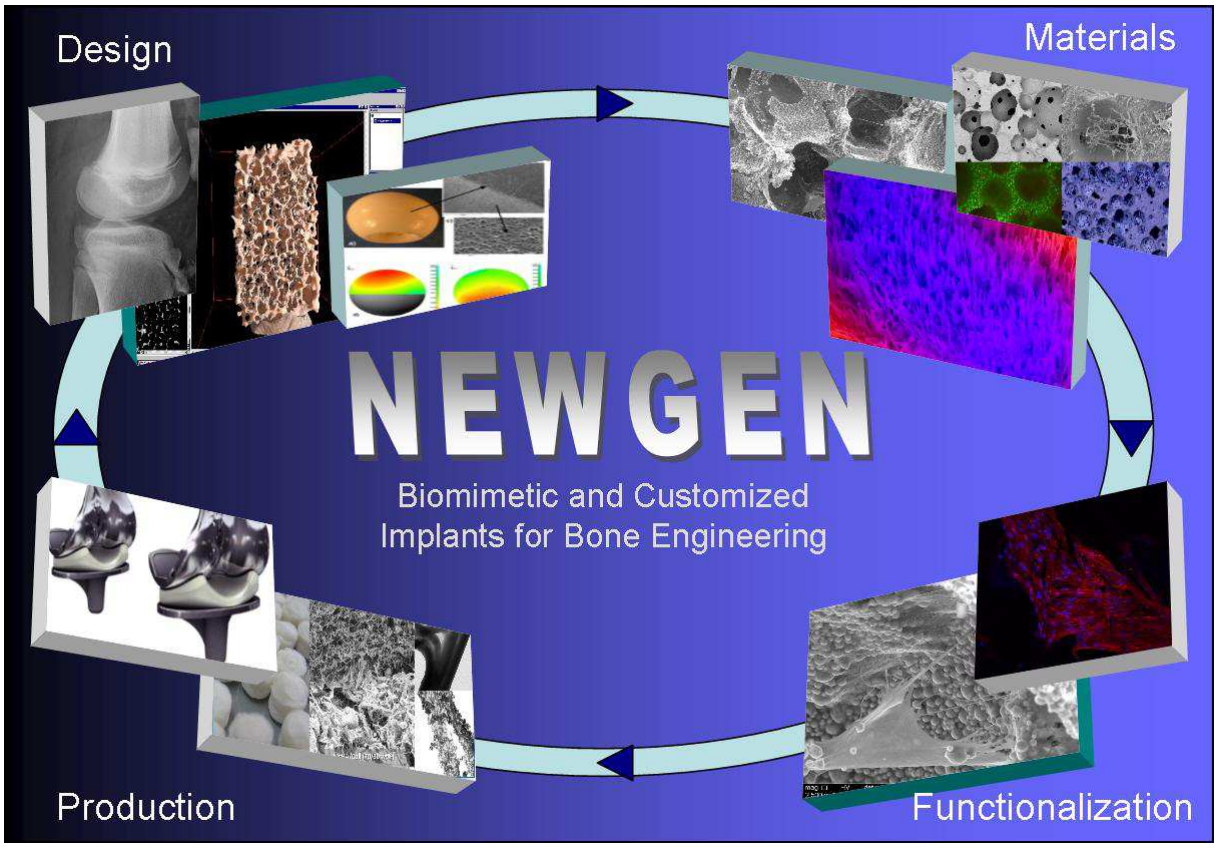
# COST ACTION MP1301 : NEWGEN

**NEW GENERATION BIOMIMETIC AND CUSTOMIZED IMPLANTS FOR BONE ENGINEERING**

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**<u>Chair</u> : Dr. Francis Cambier – BCRC (member of EMRA)**
**<u>Vice – Chair</u> : Dr. Paola Palmero – Politecnico di Torino**

| 1 | Institution | | Website |
|---|---|---|---|
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| | - | | |
| **5** | **Keywords** | | |
| | Biomechanics, implant evaluation, sports injury, fracture risk assesment, in-vitro study | | |
| **6** | **Abstract of activities** | | |
| | Adolf Lorenz Lab for Biomechanics represents a multidisciplinary research, educational and service facility within the University Department for Orthopaedic Surgery at the Medical University of Vienna. The primary goal of the lab as an integral part of the Medical University of Vienna is the study of the musculoskeletal diseases and injuries, their rapid and accurate diagnosis and optimal treatment. To ensure accurate results, high-tech equipment is used. The research results can be incorporated directly into clinical routine in collaboration with specialists so as to ensure the best possible medical treatment.<br>Research fields include evaluation of prosthetics and other implants as well of different surgical techniques in biomechanical set-ups, clinical studies in sports orthopedics and computer-assisted fracture-risk assessment in long bones. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Emir BENCA : MC Member<br>Sonja WALZER : MC Member representative | | |

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| | Dr. Stefan Scheiner | | |
| **5** | **Keywords** | | |
| | *Bone, bone biomaterials, tissue engineering, theoretical, computational, and experimental multiscale mechanics of biological tissues, computational systems biology* | | |
| **6** | **Abstract of activities** | | |
| | The Institute for Mechanics of Materials and Structures of the Vienna University of Technology, is well-known for its theoretical, computational, and experimental activities in the mechanics of materials and structures at different length and time scales; in particular for its contributions to the multiscale mechanics of cementitious materials, as well as biological materials, such as skin and bone, and tissue engineering scaffolds. The latter competencies will be provided for COST NEWGEN; they encompass first-of-their kind multiscale models for bone composition and mechanics, be it elasticity *J Eng Mech 128, 898ff., 2002; Biomech Model Mechanobiol 2, 21ff., 2003; Eur J Mech 23A, 783ff., 2004; J Theor Biol 240, 597ff., 2007; J Theor Biol 287, 115ff., 2011; J Theor Biol 317, 384ff., 2013*; *J Theor Biol 335, 185ff., 2013,* poroelasticity *Trans Por Med 58, 243ff., 2005,* or strength *J Theor Biol 260, 230ff., 2009;* advanced poromechanical and acoustical testing of bones and bone biomaterials *Adv Appl Cer 107, 277ff., 2008; Strain 44, 153ff., 2008; Strain 45, 34ff., 2009; J Biomech 44, 501ff., 2011; J Biomed Mat Res 101A, 138ff., 2013*; and the first models for computer-aided design of bone biomaterials *J Mat Sci 42, 8824ff., 2007; Biomat 30, 2411ff., 2009; J Biomech 45, 1068ff., 2012; J Biomed Mat Res 88A, 149ff., 2009; Phil Trans Roy Soc 368A, 1913ff., 2010*. Recently, these activities have been extended towards systems biology, as to come up with a rigorous theory of mechano-biology of bone and tissue engineering scaffolds *Comp Meth Appl Mech Eng 254, 181ff., 2013.* | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member (Prof. Christian Hellmich)<br>MC Substitute : Dr. Stefan Scheiner<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| | Dr. Martin Schwentenwein | | |
| **5** | **Keywords** | | |
| | Additive Manufacturing, 3d printing, Ceramics, biodegradeable, | | |
| **6** | **Abstract of activities** | | |
| | Lithoz GmbH, based in Vienna, specializes in the development and production of additive manufacturing systems (3D-printing) of high- performance ceramics and biodegradable materials. Lithoz distributes machines and materials and also offers the option of customized solutions. Through many years of experience in research and development Lithoz has gained competence in materials such as glass ceramics, oxides and bone substitutes and can support the customer's need along the whole process chain. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Lithoz can offer expertise in the whole process chain of Additive Manufacturing. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Symbiose Biomaterials s.a. | | http://www.symbiosebiomaterials.be |
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| **4** | **Other members** | | |
| | Carine Bebrone | | |
| **5** | **Keywords** | | |
| | Bio-inspired polymers, adhesives and coatings, binding peptides, antimicrobial peptides, anti-biofilm enzymes, anti-(bio)adhesive peptides | | |
| **6** | **Abstract of activities** | | |
| | Symbiose Biomaterials activities aim at bringing to the market new innovative products and processes in the field of Molecular Biomimetics**,** which means through technologies drawing their inspiration from nature's biological structures and functions at molecular-scale. Symbiose Biomaterials develops and evaluates bio-inspired synthetic polymers and engineered peptides as molecular platforms for the elaboration of adhesives and (multi-)(bio-)functional coatings with combinatorial activities such as antimicrobial, anti-biofilm and/or anti-(bio)adhesive activities. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG 3 "Functionalization of implants for improved functional and therapeutic effects" | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Antwerp University Hospital (UZA) | | www.uza.be |
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| **5** | **Keywords** | | |
| | Dental materials, operative dentistry | | |
| **6** | **Abstract of activities** | | |
| | The dept ORL&HNS combines clinical research in the Antwerp University Hospital with fundamental research at the Translational Neurosciences department of the University of Antwerp.<br>The neuro-otological research focuses on hearing implants, including cochlear, (active) middle ear and bone conduction implants, quality assurance in allograft tympano-ossicular tissue banking, aspects of obliteration and temporary canal wall removal in cholesteatoma surgery, tinnitus and disequilibrium. The current focus of basic research is on bioceramics and hydrogel material for middle ear and mastoid obliteration purposes to reduce chronic inflammation. Similar materials are sought for their application in dentistry and maxillofacial surgery.<br>The dept ORL&HNS also has ongoing research in snoring and obstructive sleep apnea, focusing on the evaluation of upper airway collapsibility and treatment by means of multilevel surgery, including transoral robotic surgery, oral appliance fitting and implantable electrical functional upper airway stimulation devices. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
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| | Tissue Engineering Group<br>Department of Basic Medical Sciences<br>Ghent University | | http://www.ugent.be/ge/mbw/nl |
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| | | | |
| **5** | **Keywords** | | |
| | Ceramics, process, characterisation, environment | | |
| **6** | **Abstract of activities** | | |
| | In the field of bone, osteochondral and meniscus engineering, research is done to select suitable biomaterials with the ultimate goal to create "tailor-made" cel/biomaterial constructs. Other research topics of our group include the "feeder-free" expansion and differentiation of human embryonic and adult (bone marrow and adipose-tissue derived) stem cells, liver tissue engineering and the development of cell/biomaterial constructs to improve vascularization. Recently, we also focused on modular tissue engineering (by self-assembling of building blocks) that would overcome some limits encountered in traditional tissue engineering (e.g. diffusion of nutrients, vascularization, large constructs, ...). Experience to design ideal porous 3D Scaffolds. With the rapid protoyping technology (Bioscaffolder), tailor-made 3D mono- and bi-functional scaffolds can be plotted. The scaffold phase inducing osteogenic differentiation can be created from a polymer blend where e.g. a particular calcium phosphate cement, cabonate containing apatite, ... is added. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
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| **5** | **Keywords** | | |
| | Ceramics, process, characterisation, environment | | |
| **6** | **Abstract of activities** | | |
| | The BCRC merges Research & Development and Services to Companies activities in the fields of materials (from the synthesis to the final product), environment (for a sustainable development) and process (from the lab to the up-scaling scale). Specialized in inorganic non-metallic materials, the BCRC carries out projects with the support of public funds, at national and international levels. Our large collection of equipments has recently been enhanced by the installation of a Spark Plasma Sintering system and the development of the platform “Hainolase” dedicated to rapid prototyping and laser machining of ceramics (in 2D and 3D). The BCRC also proposes services designed to respond to requests for physical and chemical analyses, characterisations and tests. In the biomaterials field, BCRC has been involved in the development of high performance dense ceramics like: alumina, zirconia (TZP partially stabilised by Yttria and Ceria), ZTA, non oxides and bioglasses. More recently, we have worked on macroporous biomaterials (HA, β-TCP) using classical forming or ice-templating techniques and on original additive and substractive methods allowing to produce very complex shapes made of all kind of oxide ceramics or metal (stainless steel, Ti alloys) | | |
| **7** | **Involvement in NEWGEN** | | |
| | Francis CAMBIER : Chair of the Action<br>Stéphane HOCQUET : Management Committee member + STSM Coordinator | | |

| 1 | Institution | | Website |
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| 5 | Keywords | | |
| | 3D surgical technologies, R&D of medical devices | | |
| 6 | Abstract of activities | | |
| | Assistances for bone tumor surgery. Pre-operative planning based on medical image processing. Intra-operative assistance using patient-specific instruments. Use of ceramic implants to restore the anatomy | | |
| 7 | Involvement in NEWGEN | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Centre en Ingénierie des Matériaux, Université de Mons-Hainaut (UMONS) | | http://portail.umons.ac.be/FR/universite/facultes/fpms/recherche/polesderecherche/CRIM/Pages/default.aspx |
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| **5** | **Keywords** | | |
| | Al alloys, temporary prosthesis, FGM-type prosthesis, Ti Alloys | | |
| **6** | **Abstract of activities** | | |
| | Design, simulation, manufacturing and machining of FGM prosthesis based type titanium alloys.<br>Use of surface treated aluminum alloys as temporary prosthesis.<br>Research areas:<br>➢ Metal and composite alloys, manufacturing processes and coatings,<br>➢ Electrochemistry of functional coatings, application to gas sensors,<br>➢ Ceramics, glasses and cements,<br>➢ Adsorption and heterogeneous catalysis,<br>➢ Geomaterials,<br>➢ Structures and building materials. | | |
| ➢ | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | University of Liege, Institute of Dentistry and University Paris Descartes, Unité de Recherches Biomatériaux Innovants et Interfaces (URB2I-EA4462) | | www.ulg.ac.be<br>http://recherche.parisdescartes.fr/ea4462 |
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| **5** | **Keywords** | | |
| | zirconia, dental prostheses, residual stress, fractures, metastable behavior | | |
| **6** | **Abstract of activities** | | |
| | In vitro and clinical evaluation of dental ceramics used for dental prostheses and dental implant components:<br>- Mechanical behaviour: residual stresses in veneering ceramic layered on zirconia and new dental ceramics, fractures origin (in vitro)<br>- Clinical evaluation of zirconia prostheses<br>- In-mouth low thermal degradation of full zirconia (monolithic) prostheses (in vitro and clinical)<br>- Biocompatibility and soft tissue attachment of dental ceramics used for dental prostheses and dental implant components (soft tissue attachment | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG4 : In vitro evaluation of the performance | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | KU Leuven, Department of Mechanical Engineering | | www.mech.kuleuven.be/en |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | orthopaedic implants, in vitro tests, joint simulators, biomechanics, biomaterials | | |
| **6** | **Abstract of activities** | | |
| | Current activities focus on the in vitro and in silico biomechanical evaluation of orthopaedic implants and (external) assistive devices (such as orthoses and prostheses). This is done by using joint simulators (mainly for the knee) and robotic systems as well as musculoskeletal and finite element simulations. Input for these investigations is frequently obtained with in vivo 3D motion capture techniques.<br>Biomechanical parameters which are investigated with these techniques are the mechanical interaction between a device and the human body (stress transfer, pressure and pressure distribution,…) and the kinematics of (hip, knee and ankle) joints. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG2 : Manufacturing and characterization of 3D-porous scaffolds;<br>WG4 : In vitro evaluation of the performance | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | University of Banja Luka, Faculty of Medicine, Department of Oral Surgery | | www.medicinabl.com |
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| **5** | **Keywords** | | |
| | Bone scaffolds, stem cells, osteregeneration, hydrogels, biomaterials | | |
| **6** | **Abstract of activities** | | |
| | Oral surgeon, research-biomaterials | | |
| **7** | **Involvement in NEWGEN** | | |
| | MC (from September 2016) | | |

| 1 | Institution | | Website |
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| | | | |
| **5** | **Keywords** | | |
| | Biomaterials; Femtosecond laser irradiation; Surface modification; Tissue engineering, Cell growth | | |
| **6** | **Abstract of activities** | | |
| | Our group has gained expertise in microprocessing of thin films of biomaterials by ultra-short laser for application in tissue engineering. Our current projects are related with examination of fs laser induced foaming mechanism of thin films of collagen, gelatine and blends of collagen- elastin for the needs of tissue engineering. We have performed a systematic research related to the evaluation of the exact laser parameters for creation of microfoam of biomaterials, mimicking the extra cellular matrix, with controlled porosity. As an important achievement was performed successful adhesion of cells over laser treated material surfaces. It was monitored the cells proliferation and viability.<br>Another important field of our research activities is femtosecond laser interaction with dental tissue. We have studied the interaction of high energy ultra-short laser pulses to record micro- and nano-scale surface structures of irradiated dentin. We demonstrate that by selecting suitable laser parameters one can obtain efficient dentin surface preparation without evidence of thermal damage, i.e., with minimized heat affected zones and reduced collateral damage.<br>Our other research activities are related with examination of ultra-short laser ablation process of biological tissues, by employing different examination techniques: AFM, ESEM, FESEM and ToF US-LA SIMS/SNMS. We have been part of joint research projects in the frame of Laserlab Europe, and ITSLEIF FP6 initiative. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committe member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Institute of Experimental Morphology, Pathology and Anthropology with Museum – Bulgarian Academy of Sciences (IEMPAM-BAS) | | http://www.iempam.bas.bg/ |
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| | • Tanya Dancheva Zhivkova, PhD student (IEMPAM-BAS)<br>• Pavel Mitrenga, MSc (IEMPAM-BAS)<br>• Boyka Dimitrova Andonova-Lilova, MSc (IEMPAM-BAS)<br>• Lora Vladimirova Dyakova, PhD student (Institute of Neurobiology – BAS, PhD student of R. Alexandrova in IEMPAM-BAS) | | |
| **5** | **Keywords** | | |
| | Cell cultures, Biocompatibility, New materials, Bone implants, Cell and tissue engineering | | |
| **6** | **Abstract of activities** | | |
| | Our group is involved in Investigations in the fields of experimental oncology, oncovirology and experimental pharmacology as well as in searching for improved new materials for bone implants. The evaluation of biocompatibility in vitro of metal ion modified calcium phosphates and composite materials has been performed using various cell cultures (murine, rat, human; primary cultures and permanent cell lines; fibroblasts, embryonic and bone marrow cells) as model systems and methods with different cellular/molecular targets and mechanism(s) of action such as MTT test, neutral red uptake cytotoxicity assay, trypan blue dye exclusion technique with automated cell counter, crystal violet staining, double staining with acridine orange and propidium iodide, FACS, electron microscopy, etc. We are interested in isolation and cultivation of mesenchymal stem cells, influence of materials (especially those designed for use in dentistry and maxillofacial surgery) on replication of some herpesviruses (HSV-1); ability of the compounds to induce some immune/ inflammation reactions. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG4: In vitro evaluation of the performance | | |

| 1 | Institution | | Website |
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| | Milena Lyubomirova Keremidarska, PhD student (IBFBME-BAS)<br>Kamelia Todorova Hristova, PhD (IBFBME-BAS)<br>Nora Nikiphorova Kostova-Koleva, PhD (Institute of Molecular Biology-BAS) | | |
| **5** | **Keywords** | | |
| | Mesenchymal stem cells, in vitro testing, polymers and composites for biomedical applications, tissue engineering | | |
| **6** | **Abstract of activities** | | |
| | Research activities in our group are focused on investigation of the mechanism of interaction of cells with biomaterials for tissue engineering applications. We evaluate indirect and direct cytotoxicity of biomaterials, viability, adhesion behaviour, growth and functions of cells under contact with various model surfaces, biomimetic hydroxiapatite/protein and polymer/nanodiamond composites, electrospun nanofibrous scaffolds, nanodiamond particles, etc. We perform a systematic investigation on the influence of the biomaterial surface properties, including wettability, porosity, roughness, elasticity, chemical modification, etc. on cell behaviour. Besides, we have experience in the isolation and cultivation of mesenchymal stem cells from bone marrow and characterization of their differentiation *in vitro*. Our current projects are related to examination of the role of substrate elasticity in the osteogenic differentiation of mesenchymal stem cells and development of polymer/protein nanofibrous scaffolds for the needs of bone tissue engineering. | | |
| **7** | **Involvement in NEWGEN** | | |
| | We would like to participate in Work Group 4 : In vitro evaluation of the performance | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Ryerson University | | www.ryerson.ca |
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| | | | |
| 5 | Keywords | | |
| | biomaterials for orthopaedic applications; therapeutic materials for surgery; in vitro diagnostics | | |
| 6 | Abstract of activities | | |
| | Ryerson University is a vocational, commercially oriented university of 33,000 students and has recently signed a collaborative agreement with St Michael's hospital which will offer 'end-user' (ie clinical) advice for biomedical and biomaterial advances designed by Towler | | |
| 7 | Involvement in NEWGEN | | |
| | Non-COST member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | AO Research Institute Davos (ARI)<br>AO Foundation | | www.aofoundation.org |
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| **4** | **Other members** | | |
| | Dr. Marianna Peroglio, Dr. Vincent Stadelmann | | |
| **5** | **Keywords** | | |
| | Bone regeneration, stem cells, in vivo imaging, biomaterials | | |
| **6** | **Abstract of activities** | | |
| | Professor Mauro Alini is leading the Musculoskeletal Regeneration Program at the AO Research Institute Davos, a multidisciplinary research team with focus on bone regeneration, disc/cartilage regeneration, stem cells, and biomaterials.<br>Dr. Marianna Peroglio is research scientist in Musculoskeletal Regeneration Program at the AO Research Institute Davos. Her research focus is on stem cells for disc and bone repair.<br>Dr. Vincent Stadelmann is project leader in Preclinical Services Program at the AO Research Institute Davos. His main research interest in on the in vivo imaging of the bone-implant interphase. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

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| | Prof. Dr. Med. Klaus-Arno Siebenrock | | |
| **5** | **Keywords** | | |
| | Intervertebral disc degeneration, hip, pelvis and tumorsurgery, biomaterials, stem cell | | |
| **6** | **Abstract of activities** | | |
| | Dr. Benneker is a spine surgeon with a strong interest for research. His main research interest is regeneration of intervertebral disc degeneration, imaging of disc degeneration and development of minimal-invasive procedures for degeneration, trauma and problems related to osteoporosis.<br>Prof Siebenrock is Chair of the Orthopaedic Department and specialized in hip, pelvis and tumorsurgery. As a pioneer in joint preserving surgery our departments research focus lies in biomaterials, stem cell research for chondrogenesis and 3D imagining and navigation. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Dental, ceramics, zirconia, aging, fractography, trial | | |
| **6** | **Abstract of activities** | | |

As a practicing dentist and researcher, my interest has centered on understanding the reasons for clinical failure, mainly ceramic fractures. In that respect, my main research activity has been oriented towards ceramics, parameters which may influence the fracture resistance of all-ceramic restorations, fracture mechanics applied to ceramics and resin composites, longitudinal clinical studies and failure analysis using fractography on broken parts for identification of the fracture origin. The use of fractography (scanning electron microscopy and stereo microscopy) on broken parts for failure analysis was an eye opener to better understand clinical failures of brittle materials such as ceramics and resin composites. Fractography is composed of a meticulous search on a fractured surface of crack propagation features showing the overall crack propagation direction, the final break zone, and pointing back to the crack origin or area in which fracture started. The systematic application of fractography to all broken parts (in vivo, in vitro) helped verifying the quality of the tested material (presence of defects), identifying design problems or processing problems, the mode of failure (bending, torsion, sharp or blunt impact damage etc…) as well as evidence of excessive occlusal loading related to fracture (e.g. wear surfaces next to occlusal fracture origins) or grinding damage. Thanks to some relevant publications and the 5 year hands-on fractography course given from 2007-2011 at NIST under Janet Quinn's NIH grant (R01 DE 17983), this technology is picking up and researchers that followed the course are more and more using it with successful scientific insight into failures.

Other recent research activities:

1. **Post-hot isostatic pressing: A healing treatment for process related defects and laboratory grinding damage of dental zirconia?** This project: The hypothesis of this study was that post-sinter hot isostatic pressing (post-HIP) would be beneficial for improving reliability and strength of both sintered and coarse ground sintered zirconia by closing or reducing surface and/or small volume defects. No "healing" (i.e. closing of defects by densification) resulted after post-HIP.

Grinding sintered zirconia with 120 µm diamond disks induced radial cracks of 10–20 µm and an important pseudo-cubic phase transformation (56 wt%) that was not completely removed after post-HIP. Post-HIP increased slightly the relative density by 0.1% but without improving the strength and reliability.

2. **Thermally induced fracture for core-veneered dental ceramic structures:** To better understand failure characteristics of porcelain veneered to zirconia core ceramic structures, thermally induced cracking during the cooling phase of fabrication is studied here by using the extended finite element method (XFEM). The study reveals that fast cooling can lead to thermal fracture of these different bi-layered ceramic structures, and cooling rate (in terms of heat transfer coefficient) plays a critical role in crack initiation and propagation.
3. **Low temperature degradation of a Y-TZP dental ceramic**.
4. **TiNOx coatings on roughened titanium and CoCr alloy accelerate early osseointegration of dental implants in minipigs**.

| **7** | **Involvement in NEWGEN** |
|---|---|
| | |

| 1 | Institution | | Website |
|---|---|---|---|
| | University of Bern | | http://www.bonebiology.dkf.unibe.ch/ |
| **2** | **Address** | | **Country** |
| | Department Clinical Research, Murtenstrasse 35, 3010 Bern | | Switzerland |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | osseointegration, biomaterial, resorption, inflammation | | |
| **6** | **Abstract of activities** | | |
| | The interests of our research group are focused on two areas, (i) the mechanisms by which inflammatory processes modulate bone metabolism, and (ii) the osseointegration and turnover of new biomaterials. Inflammation plays a role in every healing process, be it after fracture, trauma or surgical intervention. Therefore, initial inflammatory processes also modulate the first steps of osseointegration of biomaterials and their eventual turnover and replacement by authentic bone. Understanding the critical steps in inflammation that contribute to the modulation of bone regeneration represents an approach to identify potential therapeutic targets. In a second approach, we investigate the possibility to modulate the bioactivities of anabolic pathways in bone such as the BMP – and the Wnt – pathways to enhance an ongoing repair process. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Within the NEWGEN network, we are interested in the development and application of novel biomaterials that can be used as bone substitutes. In collaboration with external partners, we investigate the possibility to produce composite materials of calcium phosphate (CaP) cements and polymer fibers of different dimensions, ranging from nano--- to micrometers in diameter. These materials will mimic bone, which itself is a composite material of hydroxyapatite and collagen fibers. The properties of the newly developed materials will be analysed by mechanical and chemical testing and in small--- animal models. The latter will be used to investigate tissue– material interactions such as osseointegration and turnover of the biomaterial. Of high relevance will be the potential inflammatory response of the recipient organism to the material. Furthermore, the distribution of the materials' components in the organism's organs upon dissolution or cellular resorption will be followed, and eventual detrimental effects will be assessed. In the WG1 "Design and Synthesis of New Marterials" we expect to contribute with our knowledge on the use and analysis of animal models and we will profit from the consortium's knowledge on the development and application of new biomaterials. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dental Materials Unit<br>University of Zurich | | www.uzh.ch |
| **2** | **Address** | | **Country** |
| | Plattenstrasse 11 8032, Zurich | | Switzerland |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Adhesion, Biomechanics of dental/medical appliances | | |
| **6** | **Abstract of activities** | | |
| | • Adhesion aspects to dental tissues and dental biomaterials<br>• Surface conditioning methods<br>• Aging of dental/medical appliances in simulated environments | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group Member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | CEITEC-Central European Institute of Technology, Brno University of Technology | | www.ceitec.eu |
| 2 | Address | | Country |
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| 3 | Contact Person | Telephone | E-mail |
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| 4 | Other members | | |
| | Dr. Klara Castkova, Dr. Ales Matousek, Dr. Daniel Drdlik, Mgr. Lenka Slabakova, Mgr. Jana Sekaninova | | |
| 5 | Keywords | | |
| | Ca-phosphates, hydroxyapatite, Ca-ZrO2, nanoparticle synthesis, (chitosan, collagen, PLA, PCL)/Ca-phosphate nanofibres, force-spinning of nanofibres, 3D printing of bioceramic and composite scaffolds, EPD, functionalization, materialography, mechanical and cell culture testing | | |
| 6 | Abstract of activities | | |
| | The research of Advanced Biomaterials Unit, which is part of the Advanced Ceramic Materials Group is focused on the preparation and properties of nanocomposite biomaterials and scaffolds with hierarchical architecture similar to the structure of natural bone. The main goal of the research is primarily focused on structurally and functionally graded composites and multiphase scaffolds based on hydroxyapatite, non-stoichiometric Ca-phosphates, Ca-phosphate substituted by biogenic elements and bioactive polymer carriers of Ca-phosphate nanoparticles supporting osteoinduction of bone cells. Biomaterial research includes a study of the synthesis, composition, shape and properties of multiphase Ca-phosphate nanoparticles and bioactive polymers and the study of the preparation, structure and properties of new composite (nano) bioceramics and scaffolds. 3D printing of bioceramic and composite scaffolds, force-spinning of biopolymer/Ca-phosphate nanofibres (scaffolds) and EPD/template methods are namely investigated.<br>1 professor, 1 senior researcher, 2 junior researchers, 4 PhD students, 2 MS students | | |
| 7 | Involvement in NEWGEN | | |
| | Prof. Jaroslav Cihlar : Management Committee/ Dr. K. Castkova: MC Substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Masaryk University, Faculty of Medicine | | http://www.med.muni.cz/ |
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| 3 | Contact Person | Telephone | E-mail |
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| 4 | Other members | | |
| | | | |
| 5 | Keywords | | |
| | stem cells, bone engineering, tooth engineering, bone marrow, neural crest cells, mesenchymal stem cells, animal models | | |
| 6 | Abstract of activities | | |
| | It is envisioned that effectiveness of the treatments of bone defects will become dramatically improved by incorporating, into the curative materials and strategies, elements that positively influence interaction between the cells and acellular implants. In principle, these elements can be represented by specifically structured inorganic materials, biomolecules (or their functional moieties), small organic molecules, and cells of various types. The research proposed here will address some aspects of the interactions of cells relevant to the metabolism of bone and bone-associated structures, bone marrow and teeth. It will profit from close collaboration and the long-term expertise of the principle investigators in the biology of embryonic stem cells, biology of haematopoietic cells, and the biology of odontogenic tissues. The following four interconnected research avenues will be followed: a) investigation of osteogenic and odontogenic potential of neural crest cells differentiated from human pluripotent stem cells under the influence of bioactive scaffolds; b) development and evaluation of artificial haematopoietic microenvironment based on biactive scaffolds; c) investigation of osteogenic and odontogenic potential of mesenchymal stem cells derived from human dental pulp under the influence of bioactive scaffolds; d) development of animal models for *in vivo* evaluation of biocompatible bone and dental grafts. | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Tomas Bata University in Zlin | | www.utb.cz |
| **2** | **Address** | | **Country** |
| | TGM-5555, Zlin-76001, Zlin, Czech Republic | | The Czech Republic |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | Dr. Nabanita Saha (PI), Dr.Lenka Jelínková, Dr. Oyunchimej Zandraa, Prof.Takeshi Kitano, Prof. Petr Saha. | | |
| **5** | **Keywords** | | |
| | Hydrogel, mimetic biomineralization, calcium carbonate, calcium phosphate, functionalized biomaterials, bioresorable biomaterial, innovative bone substitutes, calcium – rich Scaffold. | | |
| **6** | **Abstract of activities** | | |
| | **Project title : Calcium rich polymeric scaffolds for bone tissue engineering**<br>The following activities are planned to do under the proposed COST Action (NEWGEN) MP-1301 :<br>i) Scaffolds will be designed with inter-connected porosity in which osteogenic and angiogenic agents are incorporated/added.<br>ii) Bioresorable scaffolds with controlled porosity and tailored properties will be prepared using advance technologies.<br>iii) Attention will be given for the preparation of slower degrading and faster degrading polymeric scaffold.<br>iv) Scaffold materials, their geometry, pore size distribution, and ability to release biomolecules at desired rate will be investigated.<br>v) Toughness as well as reliable and reproducible manufacturing techniques for calcium rich biomineralized polymeric scaffolds will be studied.<br>vi) Hydrogel and /or Bacterial cellulose will be used as an extra-cellular matrix for biomimitic mineralization with a higher and lower concentration of calcium ion. The effect of polymer concentration, the molecular weight of the polymer and initial calcium ion concentration will also be studied. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Wish to involve in **NEWGEN** for the development of some innovative, functionalized and bioresorable biomaterials as bone substitutes/ bone tissue engineering. Among the four working Groups of NEWGEN, we wish to join in the following working Groups:<br>WG2 : Manufacturing and characterization of 3D – porous scaffolds (1st choice)<br>WG1: Design and synthesis of raw materials (for example Bacterial cellulose) (2nd choice) | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Ceramtec | | http://www.ceramtec.com |
| **2** | **Address** | | **Country** |
| | CeramTec-Platz 1-9, 73207 Plochingen | | Germany |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | Dr. Meinhard Kuntz | | |
| **5** | **Keywords** | | |
| | Advanced ceramics, production | | |
| **6** | **Abstract of activities** | | |
| | With over a century of developmental experience and production expertise, CeramTec is a global leader in the field of production and supply of advanced ceramics and engineers these materials for use in a wide variety of applications. CeramTec supplies with the current portfolio well over 10,000 different products, components and parts made of advanced ceramics, and a wide variety of ceramic materials. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Faculty Technology and Bionics<br>Rhein-Waal University of Applied Sciences | | www.hochschule-rhein-waal.de |
| **2** | **Address** | | **Country** |
| | Hochschule Rhein-Waal, Marie-Curie-Straße 1, D-47533 Kleve | | Germany |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Amir Fahmi | +49 2821 806 73 634 | Amir.Fahmi@hochschule-rhein-waal.de |
| **4** | **Other members** | | |
| | Lakshmi Muthukamy | | |
| **5** | **Keywords** | | |
| | Nanostructures hybrid materials, nano-objects, functionalised nanoparticles and rheological and thermal properties of polymeric and composite materials. | | |
| **6** | **Abstract of activities** | | |
| | My research is focusing on the development, fabrication and characterisation of novel nanostructured hybrid materials in different dimensions and length scale. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee substitute (to be confirmed)<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dental Materials and Biomaterials Research<br>RWTH Aachen University Hospital | | www.biomaterialforschung.de |
| **2** | **Address** | | **Country** |
| | Pauwelsstrasse 30, D-52074 Aachen | | Germany |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Horst Fischer | +49 241 80-80935 | hfischer@ukaachen.de |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Bone substitutes, calcium phosphates, organic-inorganic composites, scaffolds, rapid prototyping (3D powderbed printing, 3D wax printing, 3D cell printing), surface functionalization, bioactivation, tissue engineering, cell culture tests, biomechanical in vitro testing | | |
| **6** | **Abstract of activities** | | |
| | An important focus of our research team is the topic of bone substitute materials. In several joint research projects novel scaffolds are developed by using generative manufacturing techniques (rapid prototyping). Within these projects customized biodegradable composits made of calciuim phosphates, bioactive glasses, and polylactides are developed, which will additionally be tissue engineered and functionalized by specific proteins and chemical agents. The manufactured bone substitutes are mechanically and biologically characterized in detail in our laboratories. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Prosthodontics<br>School of Dentistry, University of Freiburg | | http://www.uniklinik-freiburg.de/prothetik/live/index.html |
| **2** | **Address** | | **Country** |
| | Hugstetter Straße 55 - 79106 Freiburg | | Germany |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Ralf Kohal | +49 761 270 49770 | ralf.kohal@uniklinik-freiburg.de |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Oral implants, evaluation of high performance ceramics, evaluation of cell behaviour, clinical investigations | | |
| **6** | **Abstract of activities** | | |
| | Clinical work: Comprehensive (synoptical) Dentistry. The treatment concept comprises the preprosthetic, (including periodontal, endodontic, operative and functional pre-treatment), oral implants (with bone grafting/augmentation, new implant materials) and prosthetic treatment. Diagnosis and therapy of inflammatory periodontal diseases (nonsurgical, surgical, Guided Tissue Regeneration); Soft and hard tissue augmentations treatment [ridge augmentation, sinus augmentation including autogenous, xenogenous and alloplastic materials]<br>Research activities: Evaluation of high performance ceramics in prosthodontics and implantology, Evaluation of the behaviour of different cell types on different ceramic materials and different topographies, Evaluation of a „bio-reactor“ for the investigation of osteoblasts on different biomaterials, Clinical investigations of bone replacement materials for ridge augmentation and sinus lift, Clinical investigations of (new) implant systems.<br>Scientific possibilities: Development and evaluation of (bio-)materials for reconstruction of oral tissues under different conditions, Cell culturing: Proliferation test, Electron microscopy: REM, “Bioreactor” tests, PolymeraseChainReaction (PCR: rt PCR, realtime PCR) for characterising of relevant genes, (Bio)mechanical tests for the evaluation of the stability of ceramic implants using an artificial mouth machine.<br>Animal experiments: Push-in tests to evaluate the bone-implant-bonding of different implant materials and surfaces, Cutting-grinding technique for preparation of histologic specimens: Histologic, histometric and histomorphometric analysis using computer-supported procedures | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Institute of Innovative Oral Surgery and Medicine<br>Centre for Tissue Engineering<br>TERMIS Group Musculoskeletal Tissue Engineering | | www.indente.de |
| **2** | **Address** | | **Country** |
| | Ellernstr. 23, D-30175 Hannover | | Germany |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Tissue Engineering, Clinical application, Vascularisation | | |
| **6** | **Abstract of activities** | | |
| | - Tissue Engineering, in particular Bone Tissue Engineering<br>- Clinical application of new technologies<br>- Vascularisation<br>- Regulation of cytokines during the growth of different types of new tissue | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Institute for Manufacturing Technologies of Ceramic Components and Composites<br>University of Stuttgart | | http://www.ifkb.uni-stuttgart.de/index.en.html |
| **2** | **Address** | | **Country** |
| | Allmandring 7b - 70569 Stuttgart | | Germany |
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| **4** | **Other members** | | |
| | Dr. Peter Krieg | | |
| **5** | **Keywords** | | |
| | Composite materials, performance ceramics, surface technologies, modelling simulation | | |
| **6** | **Abstract of activities** | | |
| | The Institute for Manufacturing Technologies of Ceramic Components and Composites is a new foundation at the University of Stuttgart within the faculty of manufacturing engineering since 1995.<br>The institute is focussed on research topics in manufacturing techniques for ceramic components and composites as well as in material technology. The main research scope is the interaction between modern material science, process engineering and manufacturing technologies.<br>Beside the development of economically efficient and ecologically advanced new material systems for the plant and mechanical engineering industry also new methods in material design and production engineering are investigated and evaluated.<br>The application of new materials for innovative environmental techniques is one of the key accounts within the institute and is supported by several BMBF research projects. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Mathys Orthopaedie GmbH | | www.mathysmedical.com |
| **2** | **Address** | | **Country** |
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| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | Thomas Oberbach Dipl.-Ing. | | |
| **5** | **Keywords** | | |
| | Alumina and zirconia ceramics, endoprothetics, coatings, characterisation | | |
| **6** | **Abstract of activities** | | |
| | Research in the field of alumina and zirconia ceramic materials for endoprothetics, characterisation of ceramic materials.<br>Production of ceramic materials for hip and shoulder endoprothetics, alumina and zirconia ceramic materials for endoprothetics, characterisation of ceramic materials, osseointegrative coatings. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Otto-Schott-Institut<br>Friedrich-Schiller-Universität | | www.brauergroup.uni-jena.de |
| **2** | **Address** | | **Country** |
| | Fraunhoferstr. 6, 07743 Jena | | Germany |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Therapeutic ion release, bioactive glasses | | |
| **6** | **Abstract of activities** | | |
| | Development and characterisation of new biomaterials for therapeutic ion release, including melt-derived bioactive glasses, based on a good understanding of the composition-structure-property relationship. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Experimental Trauma Surgery, Klinikum rechts der Isar, Technical University Munich | | www.unfallchirurgie.mri.tum.de |
| **2** | **Address** | | **Country** |
| | Ismaninger Strasse 22, 81675 Munich | | Germany |
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| **4** | **Other members** | | |
| | Elizabeth Rosado Balmayor, PhD<br>Alexander T. Haug, MD<br>Fritz Seidl, MA | | |
| **5** | **Keywords** | | |
| | Mesenchymal stem cells, pseudarthrosis, in vivo models, in vitro testing, 3D culture systems, biomaterials | | |
| **6** | **Abstract of activities** | | |
| | The Department of Experimental Trauma Surgery at Klinikum rechts der Isar of Technical University Munich is involved in tissue engineering of the musculoskeletal system. On the one hand we are working on bone engineering and on the other hand on the enthesis, which is the ligament-bone transition. We derive mesenchymal stem cells from the bone marrow and adipose tissue as well as from amniotic membrane. We differentiate these cells in 2D and 3D cultures and investigate the influence of age, gender. The influence of different biomaterials is also investigated. To accelerate the differentiation, we have a project investigating the role of pulsed electromagnetic fields. On the other hand, comorbidities are extremely important in orthopaedic trauma surgery. Therefore we also investigate the influence of osteoporosis and diabetes. We have found that certain microRNAs are associated with fracture risk in osteoporotic patients. On the other hand, the Wnt signalling pathway including TGF-β is influencing bone regeneration in diabetic patients. We are currently using the mentioned knowledge to enhance our in vitro bone engineering. These investigations are conducted with human material that we obtain from the operating theatre in our department. For the enthesis, we want to use different biomaterials - one elastic and one with a compressive strength comparable to bone. New materials from Newgen would be excellent to test. We are also using bioreactors for the administration of appropriate mechanical loading. We have an arsenal of possible analyses of our in vitro constructs using molecular biological techniques, biochemistry, histology, µ-CT etc. Furthermore, we are performing in vivo testing of our constructs. This can be done both in rodent and large animal models. The latter ones are mainly non-union models in sheep. Finally, we try to translate our research directly into the clinic. | | |
| **7** | **Involvement in NEWGEN** | | |
| | We would like to participate in Work Group 3 and 4, as both fit our profile. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Tribology Centre, Danish Technological Institute | | www.dti.dk |
| **2** | **Address** | | **Country** |
| | Kongsvang Allé 29 - 8000 Århus C | | Denmark |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Inge Hald Andersen | +4572201546 | iha@dti.dk |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | PVD, thin film coatings, | | |
| **6** | **Abstract of activities** | | |
| | Through a couple of decades, we have established an extensive network of national and international collaborators within the field of surface and material technology.<br>This has brought forward an extensive number of close relations, partly with small and large companies and partly with a large number of research and university environments.<br>This network is especially used in relation to the formulation of interdisciplinary research and development projects.<br>The Tribology Centre has extensive knowledge in designing knowledge development and knowledge transfer for small and large companies by linking industry related problems to research and development projects across national borders.<br>Sr containing surfaces for implants for improved bone in-growth, Micro structured thin films | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Centre for Plastics Technology/Medical Devices, Danish Technological Institute | | www.dti.dk |
| **2** | **Address** | | **Country** |
| | Gregersensvej 7 - 2630 Taastrup | | Denmark |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Scaffolds, bioresorbable implants, medical devices | | |
| **6** | **Abstract of activities** | | |
| | Danish Technological Institute is one of the world's largest private institutes to supply technological services such as consultancy, tests, certification and training for companies and public-sector organisations. The Institute adopts an interdisciplinary approach to innovation and to the task of improving the ability in particular of small and medium-sized companies to exploit new technologies and management tools.<br>Over the last 17 years the Centre for Plastics Technology/Medical Devices has been coordinating and participating in EU, ESA and national projects focussed on the development of scaffolds and bioresorbable devices for tissue integration and regeneration. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Energy Conversion and Storage<br>Technical University of Denmark | | www.dtu.dk |
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| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Ceramic processing, glass, corrosion | | |
| **6** | **Abstract of activities** | | |
| | Ceramic processing including 3D-printing, particularly with porous materials, and applications of glass materials, particularly as high temperature sealant. Additional activities are on corrosion of glass and ceramics, both in aqueous and high temperature environments and a on methods for materials characterization, which was recently extended to 3D-charcterisation of ceramics through EBSD in combination with FIB. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Ruđer Bošković Institute | | http://www.irb.hr/eng |
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| | Maja Dutour Sikirić<br>Darija Jurašin | ++38514560941<br>++38514560941 | sikiric@irb.hr<br>djurasin@irb.hr |
| **4** | **Other members** | | |
| | Atiđa Selmani<br>Damir Kralj<br>Nadica Maltar Strmečki | | |
| **5** | **Keywords** | | |
| | biomimetic, calcium phosphates, coatings, drug delivery, organic-inorganic composites, | | |
| **6** | **Abstract of activities** | | |
| | Research activities in our group is focused on investigating the influence of various classes of inorganic and organic additives on calcium phosphate precipitation and transformation and in applying thus obtained knowledge in design and biomimetic preparation of calcium phosphate based composite biomaterials. Recently, we started investigating these materials as possible drug delivery systems. Currently, the main research topics are:<br>i) development of organic-inorganic coatings for bone implant materials with incorporated drugs<br>ii) investigation of the influence of inorganic nanostructures on calcium phosphate formation<br>iii) design and characterization of injectable calcium phosphate based organic-inorganic composites | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG 1 “Design and synthesis of new materials”<br>WG 3 “Functionalization of implants for improved functional and therapeutic effects” | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Ruđer Bošković Institute | | http://www.irb.hr/eng |
| **2** | **Address** | | **Country** |
| | Bijenička c. 54 | | Croatia |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Andreja Gajović | ++38514561106 | Andreja.Gajovic@irb.hr |
| **4** | **Other members** | | |
| | Milivoj Plodinec<br>Jelena Macan<br>Damir Iveković | | |
| **5** | **Keywords** | | |
| | ceramics, calcium phosphates, coatings, Raman spectroscopy, electron microscopy, X-ray diffraction | | |
| **6** | **Abstract of activities** | | |
| | Research activities in our group are focused on structural characterization of bioceramics and biomimetic calcium phosphate coatings on different substrates (ceramic, metal, glass). The results are used in optimising the design and preparation of ceramics for bone implants as well as inorganic (i.e. calcium phosphate) and organic (i.e. polyelectrolytes) coatings. Recently, we started investigating bone implants as possible drug delivery systems. Currently, the main research topics are:<br>iv) design and preparation of biocompatible ceramics<br>v) design and characterization of calcium phosphate coated high-strength stabilized ceramics for bone implants | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG2 : “Manufacturing and characterization of 3D-porous scaffolds”<br>WG 1 “Design and synthesis of new materials” | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | AzureBio S.L. | | www.azurebio.com |
| **2** | **Address** | | **Country** |
| | Ronda de Poniente 16, Bajo L, 28760 Tres Cantos, Madrid | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Arcadio Garcia de Castro<br>Founder and Director | +34 918031715 | agc@azurebio.com |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Synthetic bone regeneration, drug and vaccine delivery system, in vitro and in vivo models | | |
| **6** | **Abstract of activities** | | |
| | AzureBio S.L (Spain) is focused in the application of biomaterials in human health. Areas of interest are synthetic bone regeneration materials and drug and vaccine delivery systems. AzureBio has developed a synthetic bone regeneration matrix, Sil-Oss®, and has strong expertise in in vitro and in vivo models of bone regeneration. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Material Science and Metallurgy Engineering /ETSEIB<br>Universitat Politècnica de Catalunya-BarcelonaTECH | | http://www.etseib.upc.edu/ |
| **2** | **Address** | | **Country** |
| | Diagonal 647. 08028-Barcelona | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Marc Anglada | +34 9340116701 | marc.j.anglada@upc.edu |
| **4** | **Other members** | | |
| | Dr. Emilio Jiménez, Dr. Gemma Fargas, Dr. Joan Josep Roa, Dr. Fernando García, | | |
| **5** | **Keywords** | | |
| | Fracture mechanics, micromechanics of ceramics and coatings, mechanical characterisation, | | |
| **6** | **Abstract of activities** | | |
| | Expert in fracture mechanics, fatigue and reliability of ceramic materials, including bioceramics: zirconia, alumina and composites. Study of low temperature degradation of zirconia. Modification of zirconia for protection against low temperature degradation. Reliablity of porous zirconia.<br>Nanoindentation and micromechanics of ceramics and ceramic coatings. Mechanics of porous ceramics. Focused Ion Beam and FIB based tomography.<br>Processing of ceramics. Corrosion and interaction. Thermal shock, fatigue and corrosion cracking.<br>Crystallographic analysis and deformation mechanisms. EBSD and AFM.<br>Mechanics of zirconia and porous zirconia, surface modification of bioceramics. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Histocell S.L. | | www.histocell.com |
| 2 | Address | | Country |
| | Parque Tecnológico de Bizkaia 800, 2º 48160 Derio – Bizkaia | | Spain |
| 3 | Contact Person | Telephone | E-mail |
| | Dr. Begoña Castro Feo | +34 946567900 | bcastro@histocell.com |
| 4 | Other members | | |
| | Dr. Eva Gonzalez | | |
| 5 | Keywords | | |
| | Tissue engineering, cell therapy, regenerative and repair medicine | | |
| 6 | Abstract of activities | | |
| | SME working on the emerging fields of Tissue Engineering and Cell Therapy, with wide experience in researching, developing, validating, manufacturing and marketing novel pharmaceutical products based on human cells and bioactive materials for their use within the field of Regenerative and Repair medicine.<br>HISTOCELL owns a wide IP portfolio featuring 9 different patent families with a total number of 40 patent files currently being processed. Most patent families, 6 out of 9, have been developed using HISTOCELL proprietary technologies. | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Instituto de Cerámica y Vidrio | | www.icv.csic.es/ |
| **2** | **Address** | | **Country** |
| | Campus de la UAM, C/ Keisen 5, 28049 Madrid | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Carmen Baudin, Ph.D | (+34) 917355840 | cbaudin@icv.csic.es |
| **4** | **Other members** | | |
| | Prof. Pilar Pena, Dr. Raúl García Carrodeguas, Dr. Antonio de Aza, Dr. Miguel Ángel Rodriguez | | |
| **5** | **Keywords** | | |
| | Phase equilibrium diagrams in ceramic systems: applications in structural ceramics, refractories and biomaterials | | |
| **6** | **Abstract of activities** | | |
| | Phosphates and silicophosphates for bone regeneration. Mainly from a thermochemical stand point. Compositional and microstructural design. Additives (e.g. Mg) and dopants (e.g. Zn). Analysis of microstructural modifications after biological tests.<br>Here we have a lot of experience preparing 3D-scaffolds by foam impregnation or by controlled sintering of agglomerates, and we would like to move towards rapid prototyping of 3D scaffolds. In terms of sintering, we can propose also SPS sintering of porous materials.<br>Mechanical characterization of dense and porous materials. Specifically we have studied the macroscopic properties of wollastonite and TCP materials and of resin-based composites. We have also experience on dense alumina and zirconia based materials which can be the basis for materials for prosthesis. Our collaboration on wear can be included. Here we would like to move towards local characterization by nano indentation and nano scratch. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Product Development Laboratory<br>Mechanical Engineering Department<br>Universidad Politecnica de Madrid | | www.upm.es/ |
| **2** | **Address** | | **Country** |
| | c/ Jose Gutierrez Abascal 2 - 28006 Madrid | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr Andres Diaz Lantada | +349 13363120 | adiaz@etsii.upm.es |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Design and manufacturing with polymers, development of medical devices, biomechanics & bioengineering | | |
| **6** | **Abstract of activities** | | |
| | Research in different areas related with product development, specially focused on medical devices, including rapid prototyping technologies, CAD-CAE-CAM tools, and active materials for improving diagnostic and therapeutic applications of biodevices. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Rey Juan Carlos University | | www.urjc.es/ |
| 2 | Address | | Country |
| | Calle Tulipán s/n. 28933 Móstoles. Madrid | | Spain |
| 3 | Contact Person | Telephone | E-mail |
| | Dr. Laura Ceballos | +349 14888940 | laura.ceballos@urjc.es |
| 4 | Other members | | |
| | Mª Victoria Fuentes, Nuria Escribano, José Aranguren, Bruno Baracco | | |
| 5 | Keywords | | |
| | Dental tissue, interfaces characterization | | |
| 6 | Abstract of activities | | |
| | In Dentistry, specifically in the stimulation of dentinogenesis, the remineralization of caries and erosion affected tissues and the restoration of defected adhesive interfaces or, in Endodontics, the radicular conduct sealing, perforations or apical closing induction, an extensive development of bioactive materials is yet to be performed.<br>In Restorative Dentistry the investigation is focused on the development of new adhesive systems and bioactive composites for dental direct restorations. In the process, their composition has been modified, containing, for example, nanoparticles of amorphous calcium phosphate (NACP), with capacity to leach calcium and phosphate ions in case of pH decrease. Moreover, antibacterial agents with the purpose to inhibit secondary caries are also under study. The mechanical properties of these resin composites, such as tensile and flexural strength, wear resistance, hardness, elasticity, conversion rate, remineralization and antibacterial activities need to be characterized. For dental adhesives, the bond strength, micro and nanoleakage resistance, as well as interface longevity should be determined. Another field of research is dentin-pulp complex regeneration by biomaterial sable to stimulate and modulate the healing process to properly seal the pulp wound and prevent bacterial leakage. Likewise in Endodontics where tricalcium silicate cements are under study for multiple purposes: permanent dentin restoration, deep cervical or radicular lesions, pulp capping, pulpotomy, root and furcation perforations, internal/external resorptions, apexification, retrograde surgical filling. Studies to evaluate their clinical application characteristics and physical, biological properties and bioactivity are warranted.<br>Our research group, in collaboration with other groups within the project, could help designing and formulating new bioactive materials according to Restorative Dentistry requirements. These new materials, once developed, could also be tested by our group whenever they are applied for dental purposes and, according to their respective indications, mechanical and physical properties can be determined, for example, conversion rate, bond strength to enamel and dentin by microtensile bond strength testing, sealing ability, morphological characterization of the interfaces, etc. | | |
| 7 | Involvement in NEWGEN | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Rheumatology Service - Hospital Clínico San Carlos<br>Universidad Complutense de Madrid | | www.ucm.es |
| **2** | **Address** | | **Country** |
| | C/ Prof Martin Lagos s/n, 28040. Madrid | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Benjamín Fernández-Gutiérrez | +34913303615 | bfernandez.hcsc@salud.madrid.org |
| **4** | **Other members** | | |
| | Dr. Jose Ramon Lamas, Dr. Maria Pilar Tornero, Dr. Luis Rodriguez-Rodriguez | | |
| **5** | **Keywords** | | |
| | Stem cells, musculoskeletal diseases | | |
| **6** | **Abstract of activities** | | |
| | Musculoskeletal Pathology Area: The Rheumatology Service has an established history of research focused for over twenty years on lymphocyte activation in autoimmune disease, particularly rheumatoid arthritis. It has operated using public and private funding and numerous publications exist in relation to this field. This line of research is lead by Dr. Fernández-Gutierrez. In relation to research in the field of regenerative medicine, there is a line of collective research between the orthopaedic surgeons and rheumatologist focused on the study of the pathology of articular cartilage in osteoarthritis and potential uses of MSCs that began more than five years ago with an study of the cellular and molecular mechanisms involved in the stimulation and regeneration of articular cartilage in osteoarthritis as well as an study of inflammatory mechanisms involved in musculoskeletal disorder based on mesenchymal stem cell and proteomic analysis.<br>In recent years the studies undertaken relevant to the proposed theme of this project can be summarised as follows: Optimisation of the conditions of extraction, isolation, expansion, and characterisation of MSCs isolated from bone marrow as well as experienced in the differentiation of MSCs towards chondrocyte or osteoblast lineage; Development of an animal model of chronic/acute rotator cuff tendon tears and its repairment with MSCs in combination with different scaffolds; Non-commercial clinical trial: one of which focused in the area of cell therapy involving autologous transplant of MSCs in combination with collagen type I membranes.<br>Additionally, apart from two highly functioning laboratories, fully equipped, the research group count between its facilities with a clean room. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Polymer Nano and Biomaterials - Institute of Polymers, CSIC and CIBER-BBN | | htpp://www.ictp.csic.es |
| **2** | **Address** | | **Country** |
| | Juan de la Cierva 3, 28006 – Madrid | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Julio San Roman | +34915618806 | jsroman@ictp.csic.es |
| **4** | **Other members** | | |
| | Dra. Blanca Vazquez , Dr. Luis- María Rodriguez Lorenzo, Dra. Maria Rosa Aguilar | | |
| **5** | **Keywords** | | |
| | Polymers and composites for biomedical applications. Supports for Tissue Engineering, Drug Delivery systems and polymer therapeutics | | |
| **6** | **Abstract of activities** | | |
| | Design and preparation of biodegradable and bioactive polymers and composites fro biomedical applications, Tissue Engineering, Drug Delivery systems.<br>Characterization of polymers and composites structure, morphology, and stability in physiological conditions<br>“In vitro “ behaviour of polymers and composites of natural origin and synthetic.<br>Functionalization of polymers and composites for Tissue Engineering<br>Methodologies for the preparation of support matrices and scaffolds for regenerative medicine. Application of supercritical conditions and electrospinning. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Member of the consortium with interest in the participation in cooperative multidisciplinary projects. Participation in the WG1, “Design and Synthesis of new materials”, Task 1 (Design and end user; Task 3: Raw materials synthesis and characterization.<br>WG2, “Manufacturing and characterization 3D porous scaffolds”, in tasks 4 and 6: Manufacturing (electrospining, supercritical CO2 technologies) and task 6 characterization (Structure and morphology).<br>WG3, Functionalization of polymers and composites<br>WG4: In vitro testing (cell behaviour with specific cell lines, and standard normalized assays. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Grupo de Tecnología Sanitaria, Instituto de Biomecánica de Valencia (IBV) and CIBER-BBN | | htpp://www.ibv.org |
| **2** | **Address** | | **Country** |
| | Instituto de Biomecánica de Valencia, Universidad Politécnica de Valencia, Edificio 9C, 46022 Valencia | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. José L. Peris-Serra | +34 963 879 160 | joseluis.peris@ibv.upv.es |
| **4** | **Other members** | | |
| | Dr. Jaime Prat, Dr. Carlos Atienza, BSc. Víctor Primo | | |
| **5** | **Keywords** | | |
| | Healthcare Technology, Biomechanics, Implants, experimental surgery, Bone, Cartilage, Histology, Mechanical testing, Implants customisation | | |
| **6** | **Abstract of activities** | | |
| | Implants design and biomechanical characterization of implants.<br>Experimental surgery in rabbits to study in vivo behavior biomaterial scaffolds.<br>Bone and cartilage histomorphometry from undecalcified samples.<br>Densitometric studies from CT and RMN images using Materialise software.<br>Finite element modeling.<br>Implants customization. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Member of the consortium with interest in the participation in cooperative multidisciplinary projects.<br>Participation in:<br>WG1, “Design and Synthesis of new materials”, Task 1 (Design and end user).<br>WG2, “Manufacturing and characterization 3D porous scaffolds”, in tasks 6: Characterisation of parts (Biomechanical testing).<br>WG4: Task 2 “Medical assessment and environmental and industrial impacts”<br>In vivo testing (implantation in rabbit model and evaluation –Biomechanical, histomorphometry, densitometry-). | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Instituto de Bioingenieria de la Universidad Miguel Hernandez | | http://bioingenieria.umh.es/ |
| **2** | **Address** | | **Country** |
| | Avda. de la Universidad s/n 03202 Elche-Alicante | | Spain |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Piedad N. De Aza | +34966658485 | piedad@umh.es |
| **4** | **Other members** | | |
| | Dra. Patricia Mazón, Dr. Pablo Velasquez, Dr. Jose E. Mate Sanchez de Val | | |
| **5** | **Keywords** | | |
| | Ceramics for biomedical applications. Calcium phosphates and silico-calciumphosphate ceramics, Bone substitutes, In vivo evaluation. | | |
| **6** | **Abstract of activities** | | |
| | An important focus of our research team is the topic of bone substitute materials. In several research projects novel ceramics were design and manufactured for orthopedic and dentistry applications.<br>Synthesis, characterization and study of the sintering of different ceramics: calcium phosphates and silico-calciumphosphates for medical applications.<br>The manufactured bone substitutes are physical and biologically characterized in detail in our laboratories | | |
| **7** | **Involvement in NEWGEN** | | |
| | Participation in the:<br>WG1 “Design and synthesis of new materials”<br>task 1: “Design and end-user “ and<br>task 3: “Raw material synthesis and characterizations”<br>WG4: In vitro testing (animal model). | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | University of Helsinki | | https://www.helsinki.fi/en |
| **2** | **Address** | | **Country** |
| | Fabianinkatu 33, 00014 University of Helsinki | | Finland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Virpi Muhonen | +358-40-7011764 | virpi.muhonen@helsinki.fi |
| **4** | **Other members** | | |
| | - | | |
| **5** | **Keywords** | | |
| | Biomaterials, Cartilage repair, Chondrogenesis, Regenerative medicine, Tissue engineering | | |
| **6** | **Abstract of activities** | | |
| | The Orthopaedic Research Group is focused on both developing and translating cartilage repair therapies. Today, there are no treatments available for restoring the original functionality of cartilage. Regardless of the cause, the result of cartilage damage is consistently the same: pain and decreased mobility, which adversely affects lifestyle and activity levels. Cartilage tissue has extremely low self-reparative potential and if an injury is left untreated, it's considered the first step in the joint degenerative process, leading to debilitating osteoarthritis. Joint trauma may also lead to deep osteochondral defects with severe subchondral bone loss. The consecutive impairment of joint biomechanics and tissue metabolism lead to dysfunction of the joint as an entity and increase the risk of post-traumatic osteoarthritis and collapse of the joint structure. Because an intact cartilage-bone unit is essential for proper function of a joint, subchondral bone lesions associated with cartilage defects need to be treated alongside cartilage defects. Thus, the ultimate goals of joint repair are to restore the bone-cartilage unit that matches the properties of normal joint and to prevent the progression to osteoarthritis. We aim to regenerate the functionalities of cartilage and subchondral bone by combining biomaterials, tissue engineering and cell biological know-how. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee Substitute<br>Working Group Member (group 4) | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | BioMediTech, Institute of Biosciences and Medical Technology<br>University of Tampere | | www.uta.fi |
| **2** | **Address** | | **Country** |
| | Biokatu 12 - 33520 Tampere | | Finland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr.Susanna Miettinen | +358 40 749 7095 | susanna.miettinen@uta.fi |
| **4** | **Other members** | | |
| | Dr. Sari Vanhatupa - sari.vanhatupa@uta.fi | | |
| **5** | **Keywords** | | |
| | Stem cell biology, tissue engineering, molecular mechanisms of osteogenic differentiation | | |
| **6** | **Abstract of activities** | | |
| | Key areas of our research group are stem cell biology, tissue engineering in the field of bone-cartilage- and soft tissues and development of GMP (good manufacturing practice) compliant techniques for clinical use and tissue models. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Dr.Susanna Miettinen : Management Committee member<br>Dr. Sari Vanhatupa : Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Anthogyr | | www.anthogyr.com |
| **2** | **Address** | | **Country** |
| | 2237 Avenue André Lasquin – 74700 Sallanches | | France |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Nicolas Courtois<br>R&D Project Manager | +33 (0)4 50 58 02 37 | n.courtois@anthogyr.fr |
| **4** | **Other members** | | |
| | Ir. André Joly | | |
| **5** | **Keywords** | | |
| | Dental instrument and implantology, production | | |
| **6** | **Abstract of activities** | | |
| | ANTHOGYR, created in 1947, has 65 years experience in dental instruments and over 25 years in dental implantology. Today, it is the only company worldwide offering a global solution in the field (motor, instruments, implants and customized prostheses). In France, ANTHOGYR has a staff of over 200 employees at single site of 8,000 m2. Its turnover grew by 17% to 27 M€ in 2012. Abroad, ANTHOGYR is also growing in over 85 countries. Its business is diversified into three sectors: instrumentation, dental implantology and subcontracting of micromechanical devices for the medical, watchmaking and aeronautical industries. The industrial site is able to produce more than 2 million pieces a year. The R&D department has a staff of 7 project managers/ engineers and 2 design technicians. Its commitment in the improvement of implant solutions drives the interest of Anthogyr to participate to the COST action NEWGEN. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Service Recherche & développement<br>BAIKOWSKI SAS | | www.baikowski.com |
| **2** | **Address** | | **Country** |
| | BP501, 74330 La Balme de Sillingy | | France |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Lionel Bonneau, Directeur R&D Marketing Technique | +33 450226910 | bonneau@baikowskichimie.com |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Alumina powder, high quality mineral powders, articular prosthesis | | |
| **6** | **Abstract of activities** | | |
| | Baikowski, leader mondial pour la production de poudres d'alumine de haute pureté, développe et commercialise également des formulations minérales à base d'alumine, de zirconium et de terres-rares. S'appuyant sur son département de Recherches & Développement, son unité pilote et ses unités industrielles basées en France (Poisy), Etats-Unis (Charlotte, NC and Malakoff TX) et Japon , BAIKOWSKI développe des poudres fines minérales de haute qualité (savoir-faire dans le contrôle de la synthèse de cristaux inorganiques, la pureté chimique et celle des phases cristallographiques, la taille, la forme des particules , la surface spécifique, la porosité) et des formulations à destination des applications céramiques (éclairage, biocéramiques, ultrafiltration, pièces de précision, catalyse), polissage (disque dur, semi-conducteurs, optique, métallographie) et additifs (lampes fluorescentes, média magnétiques, encres/peintures, films/fibres, composite polymères, résines époxy). Plus particulièrement, dans le domaine des applications céramiques BAIKOWSKI sert actuellement deux niches de spécialités : les tubes de lampe translucides pour lampe à vapeur métallique et les prothèses articulaires (domaine biomédicale). L'adaptation des poudres céramiques aux spécificités de nouvelles technologies de mise en forme est une préoccupation constante de BAIKOWSKI qui se décline dans de nombreux projets collaboratifs. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Biomaterials Research Group<br>U1008 INDERM Medicaments and Medicaments for Controlled Delivery<br>Université Lille 2 - Faculté de Médecine | | http://www.biomaterials.com.fr |
| **2** | **Address** | | **Country** |
| | 1, place de Verdun 59045 LILLE cedex | | France |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Hartmut F. HILDEBRAND<br>Research Director | +33(0)359518301 | fhildebrand@univ-lille2.fr |
| **4** | **Other members** | | |
| | Dr. Nicolas BLANCHEMAIN, Dr. Feng CHAI | | |
| **5** | **Keywords** | | |
| | Pre-clinical and clinical development of medical devices, functionalisation | | |
| **6** | **Abstract of activities** | | |
| | Expertise in the pre-clinical and clinical development of medical devices, functionalisation with therapeutic molecules for controlling cell/substrate interactions by Drug Delivery Systems or by their immobilization in orthopaedic domains. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | BIOTECH INTERNATIONAL | | www.biotech-international.com |
| **2** | **Address** | | **Country** |
| | 305, allée de Craponne - 13300 Salon de Provence | | France |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Frédéric IMPELLIZZERI | +33 490446060 | f.impellizzeri@biotech-international.com |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Dental implants, osteosynthesis plates and screws | | |
| **6** | **Abstract of activities** | | |
| | Company created in 1987 – 120 people / 20 M€ turnover - Medical devices manufacturer specialized in dental implants and osteosynthesis plates and screws for extremities | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Université de Reims Champagne Ardenne – LISM | | www.univ-reims.fr/lism |
| **2** | **Address** | | **Country** |
| | Campus Moulin de la Housse, BP1039,<br>51687 Reims cedex 2 | | France |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr Anne-Lise DALTIN | 33 3 26 91 84 49 | al.daltin@univ-reims.fr |
| **4** | **Other members** | | |
| | Prof Jean-Paul CHOPART, Prof Pierre MILLET, Sylvie BEAUFILS | | |
| **5** | **Keywords** | | |
| | Nanoparticles, Calcium phosphate, Electrodeposition | | |
| **6** | **Abstract of activities** | | |
| | LISM (Laboratoire d'Ingénierie et Sciences des Matériaux) activities revolve around three major poles focused on both the development and shaping of materials and biomaterials (metal alloys, polymers, insulators, semiconductors, hydroxyapatite, bioglasses) and their characterization and multi-scale modeling. Researches concern both the implementation of synthesis methods or materials processing and the study of their properties as well as the understanding of the mechanisms involved. The LISM has significant experience in the field of electrochemistry. Studies of the electrodeposition (low-cost method) of alloys, oxide and biomaterials are conducted and the influences on morphology, crystallographic phase composition or the physical properties of the material are analyzed depending on numerous parameters such as bath composition, convective mode, electrochemical conditions (intensiostatic or potentiostatic condition, pulsed current,...), superimposition of a magnetic field on the electrochemical cell. | | |
| **7** | **Involvement in NEWGEN** | | |
| | The current work of LISM in the area of NEWGEN concerns the electrocrystallization of calcium phosphate nanoparticles and their characterization. The laboratory has begun to work in a program on extracellular hydrogel matrix reinforced by nanoparticles in association with the Laboratoire d'Ingénierie Ostéo-Articulaire et Dentaire (LIOAD) of Nantes (France). The LISM team studies the production of size-controlled nanoparticles of hydroxyapatite by out-of-phase pulsed sonoelectrochemistry and the nanowire synthesis by the template method (nanowire diameter of 30 to 400 nm). The pulse-sonoelectrochemistry depends on the implementation of electrical pulses and pulsed out-of-phase ultrasounds. The method allows the production of nanoscale powder with narrow particle size distribution to meet specific needs for the synthesis of injectable bone substitutes. The goal is to add these particles in injectable matrices to improve mechanical properties for cartilage and bone tissue engineering. These two methods have been developed in our laboratory from a long time and are accentuated due to the recent acquisition of experimental setup that includes glavanostat/potentiostat and ultrasonical unit specially dedicated to this program. This experimental setup is completed by a nanoparticle size and zeta potential analyzer. In the template method, materials grow inside the nanopores of an insulating substrate. The usual membranes used are polycarbonate or alumina. The polycarbonate membranes that we use have different pore diameters for a thickness of 20 microns. The end of the pores which serves as cathode is made conductive by a metal deposit made on the opposite side of the membrane. To produce nanowires the growth is limited at the substrate thickness. The length of the nanowires can be controlled. The combination of these techniques and changes in many parameters should allow us to synthesize hydroxyapatite nanoparticles of different sizes, structures and morphologies in quality and quantity in order to mix them with the injectable hydrogels for filling bone defects.<br>Our interest in participating in NEWGEN is to develop our program and create new initiatives with European partners in the field of biomaterials for bone regeneration and implants. | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| | Prof. Didier Bernache-Assollant, David Marchat | | |
| **5** | **Keywords** | | |
| | Sintering of bioceramics, synthesis of calcium phosphates | | |
| **6** | **Abstract of activities** | | |
| | Study of the sintering of ceramics, synthesis, characterization and sintering of phosphates, especially calcium phosphates for medical applications | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
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| | INPT - CIRMAT | | http://www.cirimat.cnrs.fr/ |
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| **5** | **Keywords** | | |
| | Bone substitutes, biomineralisation, calcium phosphates, calcium carbonates, cements, physical-chemical characterisation, drug delivery, functionalisation. | | |
| **6** | **Abstract of activities** | | |
| | The *Phosphates, Pharmacotechnics, Biomaterials* research group of the CIRIMAT Institute, located at the INPT-ENSIACET and the Faculty of Pharmacy of Toulouse, gathers physico-chemists and pharmacists (galenics) around multidisciplinary themes. The research activity is centered on the synthesis, the processing, the characterization and the reactivity of materials for biomedical applications. Our activities, ranging from the elaboration of innovative (nano)materials and medical devices up to technological transfer, are developed in interaction with various socio-economical partners (SME, large industrial groups, medical clusters…) or academic laboratories, to a regional, national and international level. Our group is co-founder of the Advanced Galenics regional platform (GALA) and the international BIOCAPABILI Engineering cluster on the theme of innovative antimicrobial materials.<br>Part of the research activities concerns the synthesis, the thorough characterization and the reactivity of the calcium phosphates, and especially of biomimetic nanocrystalline apatites analogous to bone mineral and to the development of various biomedical applications based on these compounds: bone tissue engineering, drug delivery, injectable cement, setup of nanoprobes for medical imaging, bioactive coatings. Some of these bioceramics have reached an industrial development (Cementek®, α-BSM®, CERAFORM®Revolution). Another part of the research activities of the group is dedicated to the study of biopolymer-based systems and their applications in medicine (e.g. for the preparation of innovative patches, stimuli-responsive matrices, foams...) both for hard tissue and soft tissue repair. These multidisciplinary research activities are often developed in collaboration with biologists, surgeons and dentists. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management committee member (substitute)<br>WG1 : Design and synthesis of new materials<br>WG3 : Functionalization of implants for improved functional and therapeutic effects | | |

| 1 | Institution | | Website |
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| | Dr. Mariangela Lombardi | | |
| **5** | **Keywords** | | |
| | Biocompatibility of dental materials, culture cell evaluation, dental implant design, Clinical evaluation | | |
| **6** | **Abstract of activities** | | |
| | Biocompatibility of dental materials (pure titanium, titanium alloy, non precious alloys, ceramic), culture cell evaluation (human epithelial, Cells, FGH, osteoblast), dental implant design (internal hex vs other prosthetic connection), Clinical evaluation : dental implants for single tooth and multiple teeth rehabilitations | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
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| **5** | **Keywords** | | |
| | Zirconia-based ceramics and composites, ceramics for joint and dental prostheses, calcium phosphate ceramics, bioglasses, CaP cements, cell cultures, surfaces | | |
| **6** | **Abstract of activities** | | |
| | Ceramics for joint and dental prostheses, from their processing towards their mechanical properties and lifetime. Special emphasis on strength, toughness, aging of zirconia based ceramics and composites.<br>Sintered calcium phosphate ceramics, bioglasses and organic-inorganic scaffolds for bone substitute applications and tissue engineering.<br>X-Ray diffraction and TEM on biomaterials.<br>Calcium phosphate ceramics and cements: synthesis, processing, properties, including bioactivity and resorption.<br>Mechanical properties of ceramics. Nano and micro-indentation, instrumented indentation, X-Ray tomography and nano-scanner, Digital image correlation.<br>Follow-up of mechanical properties of calcium phosphates during their bio-resorption<br>Development of biomaterials, from their concept to clinical investigations,<br>Cell cultures on biomaterials: behaviour of ostoblast and osteoclast onto biomaterials, from their adhesion, growth towards fabrication of extra-cellular matrix.<br>Functionality and biocompatibity of biomaterials, anti-bacterial surfaces | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| | | | |
| **5** | **Keywords** | | |
| | Synthetic extracellular matrices for tissue engineering of cartilage and bone | | |
| **6** | **Abstract of activities** | | |
| | The LIOAD UMRS 791 is certainly one of the biggest french research groups in the biomaterial and tissue engineering of bone and cartilage. The group is composed of about 80 researchers including 20 PhD students, cell and molecular biologists, biomaterials scientists, doctors, dentists, maxillofacial surgeons. The laboratory is 1200 meters square with state of the art equipment and is located in the Faculty of Dental Surgery, Nantes Academic Hospital having access to human tissues and stem cells. The laboratory has a close collaboration with the national veterinary school of Nantes, ONIRIS, and 5 veterinary surgeons are full-member of LIOAD. Its level of scientific publication is about 30 papers each year. LIOAD has a lot of physicochemical and molecular tools for the characterization of the interfaces materials/cells/tissues. (i) Preparation and physicochemical characterizations of hydrogels, rheology, texture analyzer, SEM. (ii) Studies of the interfaces cells / materials: isolation and characterization of adult stem cells, method of cell seeding on biomaterials, cell adhesion, organization of the cytoskeleton by immunofluorescence, phenotypic characterization of the cells by real-time PCR analysis and proteomic approach. (iii) Investigation of the relationship tissues / materials: histology (embedding, sections, staining), analysis of the inflammatory response, and quantitative method for the evaluation of tissue repair (X-ray micro CT, SEM, TEM). The complementarily of teams is evident through their interdisciplinary nature: polysaccharide green chemistry, physical-chemistry and characterization of hydrogels and polysaccharides and cellular and molecular biology in the fields of bone and cartilage with skills in the field of adult stem cells. These teams have a common objective, supported by their organisms, the development both tissue engineering and regenerative medicine at regional and national levels to be in the international competitiveness of this rapidly expanding field. LIOAD is already involved in different current programmes: National "Groupe de Recherche" GdR Biopolymar (Biotherapies et polysaccharides marins), Pays de la Loire Regional Projects (BIOREGOS) and the research network BIOREGOS fed 4199 coordinated by Pierre Weiss included 15 research teams for osteo-articular regenerative medicine. LIOAD is also active members of the "Pole de Comptitivity Atlanpole Biothrapies" involved in "Biomat'in" and "Term" European clustering network. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Laboratoire des Matériaux Céramiques et Procédés Associés - LMCPA<br>Université de Valenciennes et du Hainaut Cambrésis | | http://www.univ-valenciennes.fr/LMCPA/frontpage-lmp |
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| **5** | **Keywords** | | |
| | Calcium phosphates ceramic synthesis, bioglasses | | |
| **6** | **Abstract of activities** | | |
| | The essential research topic concerns the development of bioceramics based on hydroxyapatite, tricalcium phosphate and bioglasses for bone substitutes applications. The LMCPA control the synthesis of ceramic powders and bioglasses, the manufacturing steps for porous structures and the functionalisation of the biomaterials. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
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| | PCAS group & Affiliates | | www.pcas.com |
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| **5** | **Keywords** | | |
| | Pharmaceutical ingredients, Fine and speciality chemicals, biocompatible and biodegradable polymers i.e PLGA | | |
| **6** | **Abstract of activities** | | |
| | PCAS is a fine and speciality chemicals French group (920 employees) that uses cutting-edge technology to produce complex, high added value substances, sold worldwide and which is typically involved in the development, production and marketing of fine and specialty chemical products. Most of our products are molecules or preparations that answer to tight specifications and performances, defined by or in partnership with customers.<br>R&D represents 10% of PCAS's turnover<br>Biomaterials & Recent technological advances:<br>PCAS offers three broad families of products & services:<br>- A broad range of biocompatible and biodegradable polymers used in drug delivery and medical devices.<br>- Chemical substances (APIs) and Polymers Production<br>- Manufacturing services in a GMP pharmaceutical environment | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Science des Procédés Céramiques et de Traitements de Surface (SPCTS)<br>Université de Limoges | | www.unilim.fr/spcts/ |
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| **5** | **Keywords** | | |
| | Calcium phosphate bioceramics, synthesis, characterisation, functionalization, maxillofacial surgery, dentistry | | |
| **6** | **Abstract of activities** | | |
| | A research group works at SPCTS on bioresorbable and / or bioactive calcium phosphate substitutes (hydroxyapatite and tricalcium phosphate) for bone tissue engineering. The activity includes the synthesis of specific powders (calcium deficient HA, silicated or carbonated apatites...). A particular interest is given to the shaping (microstereolithography, foam impregnation, heterocoagulation...) and sintering processes (controlled atmosphere, SPS) in order to control the architecture (multiscale porosity, complex shapes) of these bioceramics. In addition, their surface chemistry may be modified for a functionalization by biomolecules (proteins, growth factors, drugs...). The objective is to promote cell proliferation in vivo on the ceramic surface or to control the delivery of a treatment. In vitro and in vivo evaluations are conduction in collaboration with the University Hospital Center (CHU Limoges). | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| **5** | **Keywords** | | |
| | Biomaterials, biological evaluation, medical devices, biocompatibility | | |
| **6** | **Abstract of activities** | | |
| | Conception, development and *in vitro/in vivo* evaluation of innovative biomaterials and medical devices<br>• Organic-inorganic biomaterials<br>➢ PLLA-Bioglass composites<br>➢ Collagen – ceramic devices<br>• Dense ceramics for dental and orthopaedic implants<br>➢ Cerium doped zirconia and zirconia-based composites<br>• New collagen devices<br>➢ Tubes for nervous regeneration<br>➢ Anti-adhesive meshes<br>Interactions between living cells, tissues or micro-organisms and materials or particules<br>• Micro-organisms and biomaterial surfaces<br>Biofilm formation on intra-ocular lenses<br>➢ Anti-bacterial surfaces<br>• Cells and nanoparticles<br>➢ Cell labelling | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member in WP 4 | | |

| 1 | Institution | | Website |
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| | Doina-Margareta Gordin<br>Philippe Castany | | |
| **5** | **Keywords** | | |
| | biomedical alloys, titanium, microstructure, mechanical properties, low modulus, superelasticity, shape memory | | |
| **6** | **Abstract of activities** | | |
| | One of the research activities of the Metallurgical Chemistry Lab. at INSA Rennes deals with the synthesis and the characterization of biomedical alloys, particularly those in titanium. Indeed, the laboratory is one of the rare laboratories able to develop new biomedical titanium-based alloys possessing low modulus and superelastic or shape memory properties from their synthesis to their complete microstructural and mechanical characterisation. The challenge consists to optimize the chemical composition, the microstructure and the mechanical properties in order to propose new highly biocompatible titanium alloys possessing the mechanical properties adapted to medical devices of dedicated use such as hip prostheses, dental implants coronary stents, orthopaedic staples, orthodontic wires… | | |
| **7** | **Involvement in NEWGEN** | | |
| | Biomedical alloys | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Aristotle University of Thessaloniki | | http://pml.meng.auth.gr/en/Index.html |
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| **4** | **Other members** | | |
| | - | | |
| **5** | **Keywords** | | |
| | Production and characterization of porous materials, production of nanoparticles, rapid prototyping | | |
| **6** | **Abstract of activities** | | |
| | Production and properties evaluation of porous materials, Biomaterials and Bio-engineering, Rapid prototyping, Green synthesis of nanoparticles, Coatings' production and properties characterization, Materials' mechanical properties characterization, Nanoindentation technology, Bone and implants testing and FEM analysis, Stress and fatigue corrosion. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee Member<br>WG1: Design and synthesis of new materials<br>WG 2: Manufacturing and characterization of 3D-porous scaffolds<br>WG3: Functionalization of implants for improved functional and therapeutic effects | | |

| 1 | Institution | | Website |
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| **5** | **Keywords** | | |
| | bioreactors, tissue engineering, cell-material interactions, mechanical properties | | |
| **6** | **Abstract of activities** | | |
| | Using home-built bioreactors we investigate the role of applying relevant mechanical signals (and a combination thereof) to the response of cells in 3D scaffolds, in terms of morphology, cytoskeletal reorganization, gene expression etc. Imaging with confocal microscopy, nanoindentation with either AFM or a dynamic Hysitron nanoindenter, and bulk mechanical testing. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG4 and WG3 | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Institute of Electronic Structure and Lasers<br>Foundation for Research and Technology Hellas<br>University Of Crete (Hellas)<br>Department of Materials Science and Technology | | http://www.iesl.forth.gr/ULMNP |
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| **5** | **Keywords** | | |
| | Laser processing of biomaterials, Laser printing of biomaterials, Tissue Engineeering, Biofabrication. | | |
| **6** | **Abstract of activities** | | |
| | Research is focused on the implementation of laser based micro- and nano-processing methodologies for the engineering of 3-dimensional (3D) biomaterials or materials relevant to tissue engineering applications. The principal objective is to investigate the potential use of the fabricated structures as scaffolds for tissue regeneration. The techniques deployed include Ultrafast Laser Micro and Nano Structuring (ULMNS), single pulse UV Laser Irradiation of Biopolymers (UVLIB) and Laser Printing. Combinations of the 3D scaffolds obtained with well-defined biodegradable nanostructures in a "scaffold on scaffold" format are additionally investigated. The influence of the topographical features of the fabricated scaffolds on cell behaviour, related to viability, proliferation, motility, adhesion, morphology, cytoskeletal arrangement and gene expression, is examined. Furthermore in each case, control over the topography and surface chemistry of the prepared structures is demonstrated which allows further study of cell response and its dependence on the surface energy of the scaffold. The aforementioned studies on the bioactivity of the fabricated scaffolds were performed by culturing various types of cell lines as well as primary neurons and stem cells. The ultimate goal of the research team is to examine potential medical and/or clinical applications of optimized artificial tissue scaffolds. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG2 : Manufacturing and characterization of 3D-porous scaffolds<br>WG4 : In vitro evaluation of the performance | | |

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| **5** | **Keywords** | | |
| | biomaterials, biogenic implant materials, bone reconstruction materials | | |
| **6** | **Abstract of activities** | | |

Development and research on natural bone that consists of natural polymers, collagen fibers and nanocrystals of minerals, mainly nanosized hydroxyapatite (n-HA). Bone cells, which maintain the activities and metabolism of bone, are supported by and interact with this organic–inorganic hybrid matrix in nature. Artificial bone tissue scaffolds based on natural hybrids of cellulose acetate (CA) and nano-hydroxyapatite (n-HA) are fabricated in a bio-mimicking 3D matrix architecture using a single step nanomanufacturing technique and used for in-vitro bone regeneration studies. Osteoblasts grown on these scaffolds will be investigated how they interact strongly with the HA nanoclusters to form new bones.

- development of 3D fibrous polymer/n-HA scaffolds
- research on biocompatible and antibacterial coatings


1. Sang-Woon Lee, Csaba Balázsi, Katalin Balázsi, Dong-hyun Seo, Han Sung Kim, Chang-Hyen Kim, Seong-Gon Kim Comparative Study of Hydroxyapatite Prepared from Seashells and Eggshells as a Bone Graft Material TISSUE ENGINEERING AND REGENERATIVE MEDICINE 11:(2) pp. 113-120. (2014)
2. H-Y Kweon, K-G Lee, C-H Chae, C Balázsi, S-K Min, J-Y Kim, J-Y Choi, S-G Kim, Development of Nano-Hydroxyapatite Graft With Silk Fibroin Scaffold as a New Bone Substitute, JOURNAL OF ORAL AND MAXILLOFACIAL SURGERY 69:(6) pp. 1578-1586. (2011)
3. P Gouma, R Xue, C P Goldbeck, P Perrotta, C Balázsi, Nano-hydroxyapatite—Cellulose acetate composites for growing of bone cells, MATERIALS SCIENCE AND ENGINEERING C-BIOMIMETIC AND SUPRAMOLECULAR SYSTEMS 32:(3) pp. 607-612. (2012)
4. M. Furkó, M. Lakatos. Varsányi, C. Balázsi, Comparative corrosion study on silver coated metallic implants, Mat. Sci. Forum Vol. 812 (2015) pp 327-332.
5. Nikolett Oláh, Zsolt Fogarassy, Mónika Furkó, Csaba Balázsi, Katalin Balázsi, Sputtered nanocrystalline ceramic TiC / amorphous C thin films as potential materials for medical applications, CERAMICS INTERNATIONAL 41:(4) pp. 5863-5871. (2015)


| 7 | Involvement in NEWGEN |
|---|---|
| | WG1, WG2, WG3, WG4 |

| 1 | Institution | | Website |
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| **5** | **Keywords** | | |
| | Preclinical studies, hydrogels, drug delivery systems | | |
| **6** | **Abstract of activities** | | |
| | Design of preclinical studies, Including animal permissions applications, study design, study planning, costing and report writing including statistical analysis of data.<br>Hydrogels and drug delivery systems for medical applications.<br>Experience in using a wide range of analysis techniques such as Ftir, DSC, HPLC, GPC, rheometry, contact angle, AFM, SEM, tensile testing, impact testing, bright field and fluorescent microscopy, computed tomography.<br>Polymer processing techniques | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Centre for Applied Biomedical Engineering Research<br>Department of Mechanical, Aeronautical and Biomedical Engineering<br>University of Limerick | | http://www3.ul.ie/caber/index.php/ |
| 2 | Address | | Country |
| | Limerick | | Ireland |
| 3 | Contact Person | Telephone | E-mail |
| | Dr. Eamonn de Barra<br>Lecturer | +35361202942 | Eamonn.debarra@ul.ie |
| 4 | Other members | | |
| | Prof. Stuart Hampshire | | |
| 5 | Keywords | | |
| | Cardiovascular systems, medical device design, orthopaedic biomechanics, tissue engineering, biomaterials | | |
| 6 | Abstract of activities | | |
| | The CABER mission is to develop a world leading position in research and development of new medical device technology which will enhance patient care and lead to improved patient outcomes. CABER aims to pursue world class research as evidenced by high quality journal publications in the field of biomedical engineering. Core activities focus on basic and applied research in the fields of:<br>- Cardiovascular systems (Peripheral Vascular Disease, Aneurysm behaviour and treatment, Stent and stent graft behaviour, Mass Transport modelling, Cerebral modelling)<br><br>- Medical device design (Design and development of vascular grafts, Design and development of stent-graft devices for aneurysm treatment, Design of minimally invasive devices)<br><br>- Orthopaedic Biomechanics (Mechanical testing of orthopaedic implants, Wear testing of orthopaedic devices, Modelling of maxilla-facial devices)<br><br>- Cell and tissue engineering (Advanced Biomaterial and Tissue Engineering, Mechanotransduction and Cellular Pathophysiology, Bioreactor Design and Development)<br><br>- Biomaterials design and characterisation | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Stryker Orthopaedics | | www.stryker.com |
| **2** | **Address** | | **Country** |
| | Raheen Business Park, Limerick | | Ireland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Hilda Mulvihill<br>Business & Process<br>Development Project Manager | +353 61 49 83 00 | Hilda.Mulvihill@stryker.com |
| **4** | **Other members** | | |
| | Dr. Triona Kennedy | | |
| **5** | **Keywords** | | |
| | Reconstructive, medical and surgical technologies, neurotechnology, spine products | | |
| **6** | **Abstract of activities** | | |
| | Stryker is one of the world's leading medical technology companies and is dedicated to helping healthcare professionals perform their jobs more efficiently while enhancing patient care. The Company offers a diverse array of innovative medical technologies, including reconstructive, medical and surgical, and neurotechnology and spine products to help people lead more active and more satisfying lives. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Regenerative Medicine Institute, NUI Galway | | www.remedi.ie |
| **2** | **Address** | | **Country** |
| | Biosciences, NUI Galway, Dangan, Corrib Village, Galway. | | Ireland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr Jessica Hayes | +353 (0)91 494234 | jessica.hayes@nuigalway.ie |
| **4** | **Other members** | | |
| | Prof. Frank Barry ; Dr Mary Murphy | | |
| **5** | **Keywords** | | |
| | Adult stem cells ; tissue regeneration; cell manufacturing ; orthobiologics | | |
| **6** | **Abstract of activities** | | |
| | The Regenerative Medicine Institute (REMEDI) is the leading stem cell research institute in Ireland with an international reputation to translate basic research findings to clinical applications. Compounding this expertise is the recent opening of the Centre for Cell Manufacturing Ireland; one of less than half a dozen European facilities licensed to produce stem cells for clinical trials. REMEDI's link with the Clinical Research Facility (University Hospital) also represents a unique opportunity to translate research at REMEDI into regenerative therapies. Through this collaboration, REMEDI has established a bio-bank containing bone marrow derived mesenchymal progenitor cells from 100+ individuals, a significant resource for laboratories within Ireland and abroad. REMEDI freely shares samples from this significant resource with qualified collaborative laboratories, thereby expanding the impact of this significant resource. REMEDI's vision is to develop a new and realizable paradigm for medicine utilizing minimally invasive therapeutic approaches to tissue repair and regeneration. To achieve this, the REMEDI translational research programme has a mission to conduct basic research in fundamental stem cell biology and to translate and commercialise research outputs by developing regenerative medicine therapies for diseases such as; cardiovascular disease, diabetes mellitus and osteoarthritis. REMEDI Principle Investigators have particular expertise in the areas of cellular therapy, transplant biology, fundamental stem cell biology, immunology, clinical pharmacology, gene therapy, developmental biology and biomaterials. REMEDI encompasses a state-of-the-art infrastructure including imaging, histology, flow cytometry, molecular biology, mass spectrometry, gene vector and mammalian cell culture core facilities which are coordinated by a team of fully trained technical support staff. REMEDI also have a state-of-the-art pre-clinical facility with dedicated animal welfare staff and on-site surgeon. The facility also includes in vivo and ex vivo microcomputed tomography and photoacoustic imaging. In brief, research within the facility encompasses investigation into the biology of adult stem cells, Tissue engineering, biomaterial development & validation, cell transplantation protocols, Immunology of allogeneic cell transplantation, gene therapy, cell-based gene delivery, regulation of differentiation, mechanisms of engraftment and homing of transplanted stem cells, and stem cell plasticity. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group Member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of basic research and development<br>The Blood Bank, Landspitali- University Hospital<br>Reykjavik University | | http://lifvisindi.hi.is/staff/olafur-e-sigurjonsson |
| **2** | **Address** | | **Country** |
| | Snorrabraut 60, 105 Reykjavik | | Iceland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Olafur E. Sigurjonsson | +354 5435522 | oes@landspitali.is |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Bone tissue engineering, stem cell biology | | |
| **6** | **Abstract of activities** | | |
| | The Sigurjonsson laboratory is a part of the school of science and engineering at the Reykajvik University, and is located in the The Bloodbank, Landspitali University Hospital. The Research group focuses on research in bone tissue engineering and stem cell biology. In addition to that the group does research on storage of blood components using system biology methods.<br>The main focus is osteogenesis and how we can improve in vitro osteogenic differentiation using 3D scaffolds and co-culture cells models (osteoclasts and endothelical cells). We also are interested in using simple in vitro cell culture tests to analyze the properties of biomaterials that can be used for scaffold production.<br>We work with mesenchymal stem cells from bone marrow as well as with mesenchymal stem cells derived from embryonic stem cells. In addition to that we use various osteogenic cell lines. We use all major cell culture technology as well as molecular biology methods, immunochemistry methods as well as flow cytometry analysis. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Innovation Center Iceland - Department of Materials, Biotechnology and Energy | | www.nmi.is |
| **2** | **Address** | | **Country** |
| | Árleynir 2-8, IS-112 Reykjavík | | Iceland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Gyssur Örlygsson | +354 522 9000 | GissurO@nmi.is |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Medical devices, biomaterials, bone graft materials, scaffolds for tissue culture | | |
| **6** | **Abstract of activities** | | |
| | The main emphasis of Materials, Biotechnology and Energy (MBE) is to promote additional knowledge, expertise and general development of the Icelandic economy through innovation, technological development, research and knowledge transfer in chosen focus areas. MBE works towards these objectives by participation in applied development and research projects, within Iceland and overseas, while also providing consultation on technological developments and manufacturing. It also carries out various tests, which are mainly in the field of material, energy and production technology.<br>The emphases and range of projects within MBE build on the interest and needs of Icelandic industry for research and development at any time, in addition to looking to the future. Specialists within the department keep track of the stream and directions in innovation and researches in their own professional fields, within Iceland and abroad, and are alert to new opportunities.<br>Within each focus area, the department forms a group of specialists and assistants who work on demanding projects in association with universities, other research institutes and industry. Many projects are carried out with foreign partners, with the aim of furthering the connections and knowledge of Icelandic specialists and businesses with those overseas, and thus strengthening the foundation of knowledge possessed by MBE and Icelandic industry.<br>In the health technology field, work is performed on research, development and service projects connected to medical devices and biomaterials for use in tissue engineering. Research and development is carried out in the field of medical devices, such as equipment for use in dentistry and physiotherapy.<br>In general research and development projects exist in the biomaterials field, especially in the area of bone graft materials and materials to repair bones. This project relates to development of surface handling of bone grafts, while other projects aim to develop scaffolds for tissue culture. Innovation Center Iceland specialists possess a wide knowledge of disciplines such as chemistry and materials science of biomaterials, as well as having access to a wide variety of analytical equipment and facilities for development work. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Reykjavik University & University Hospital Landspitali | | http://en.ru.is/sse/bne, www.lsh.is |
| **2** | **Address** | | **Country** |
| | Menntavegi 1, 101 Reykjavik | | Iceland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Paolo Gargiulo | 003548245384 | paologar@landspitali.is |
| **4** | **Other members** | | |
| | Ólafur Eysteinn Sigurjónsson, Gissur Örlygsson | | |
| **5** | **Keywords** | | |
| | Biomedical Engineering, Tissue Engineering, Modeling, Biomechanics, prosthetic implant optimization | | |
| **6** | **Abstract of activities** | | |
| | Paolo Gargiulo has been active in the field of Clinical Engineering and medical Image processing and 3-D modeling for surgical planning. He studied at TU Wien and finished his PhD in 2008. He has published over 30 papers in peer reviewed international journals and chapters in academic books. He is currently member of EU-COST project called Namabio, consultant of MedEl co-operating with Össur for the assessment of total hip arthroplasty, with Cornell University (US) in Larynx Pacemaker development and with Washington University (US) in Brain Modeling project. Recently he has been involved in projects related to development and Assessment of Perfusion Bioreactors System Using µCT Technology and 3D modeling techniques.<br>Since december 2013 Paolo Gargiulo is the director of the Institute of Biomedical and Neural Eungineering in Iceland | | |
| **7** | **Involvement in NEWGEN** | | |
| | ➢ WG3 : Functionalization of implants for improved functional and therapeutic effects<br>➢ WG4 : In vitro evaluation of the performance | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | The Shenkar College of Engineering and Design | | www.shenkar.ac.il |
| **2** | **Address** | | **Country** |
| | 12 Anna Frank st. Ramat Gan | | Israel |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dan Lewitus | +972-3-6130111 | lewitus@shenkar.ac.il |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Polymers, Biomaterials, Scaffolds, Plastics | | |
| **6** | **Abstract of activities** | | |
| | We develop novel bioactive therapeutic macromolecules for tissue engineering applications. We are designing new production methods for creating delivery vehicles of small molecules. Through industrial partners various methods for enhancing MSCs viability for tissue engineering. | | |
| **7** | **Involvement in NEWGEN** | | |
| | 1. WG1 : Design and Synthesis of New Materials<br>2. WG2 : Manufacturing and characterization of 3D-porous scaffolds | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Advanced Technical Ceramics Department<br>Centro Ceramico Bologna (CCB) | | www.cencerbo.it |
| **2** | **Address** | | **Country** |
| | via Martelli 26, 40139, Bologna | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Francesca Prete, Ph.D<br>Materials Engineering | + 39 051 534015 | prete@cencerbo.it |
| **4** | **Other members** | | |
| | Prof. Giorgio Timellini, Dr. Arturo Salomoni, Dr. Elisa Rambaldi | | |
| **5** | **Keywords** | | |
| | bioceramics, nanostructured ceramics, zirconia, alumina, silicon nitride, glass ceramics | | |
| **6** | **Abstract of activities** | | |
| | Centro Ceramico Bologna (CCB) is a Research and Development Centre which supports the scientific and technological progress of the ceramic industry by applied research, technical assistance to industry and didactic, education, knowledge dissemination and technology transfer. It has 40 employees and is composed of five departments: Advanced Technical Ceramics, Chemistry, Energy and Industrial Processes, Environment and Industrial Ceramics.<br>CCB is a member and co-ordinator of Cer Labs-International Network of National Ceramic Laboratories. Since 1990, has carried out research activities on CERAMIC MATERIALS FOR BIOMEDICAL APPLICATIONS, cooperating with companies, Universities and Research Centres that work in the field of Engineering materials and applied clinical research. Thanks to the competences achieved in this field and to the technical and scientific equipment, Centro Ceramico is able to give assistance for the whole production cycle of BIOCERAMICS (raw materials analysis, specimens forming, sintering, analysis and characterization of the final products). Among the main research topics developed, there are the production and the characterization of ceramic materials for orthopedic and dental applications. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | LINCE lab. of Dept. of Applied Science and Technology<br>Politecnico of Torino | | www.polito.it |
| **2** | **Address** | | **Country** |
| | Corso Duca degli Abruzzi, 24 - 10129 Torino | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Paola Palmero | +39 011 0904678 | paola.palmero@polito.it |
| **4** | **Other members** | | |
| | Dr. Mariangela Lombardi | | |
| **5** | **Keywords** | | |
| | Ceramics, hybrid materials, biomaterials, 3D-scaffolds, processing, characterization. | | |
| **6** | **Abstract of activities** | | |
| | The Department of Applied Science and Technology (DISAT) of Politecnico di Torino endorses, coordinates and manages fundamental and applied research about materials science and technology, physics of condensed matter, nanotechnology, applied physics and chemistry, materials and processes for bio-engineering.<br>The Reference Research Centre LINCE (Laboratorio di tecnologia e INgegnerizzazione dei materiali CEramici) of the Consortium INSTM, which operates within DISAT, and precisely in the Materials Science and Engineering Institute, is devoted to ceramic materials technology and engineering. The mission of LINCE is to strengthen the relationships between Academia and Companies in the field of traditional and innovative ceramic materials, by promoting knowledge-based technological innovation concerning processes and /or products.<br>We have a well settled experience in the design, synthesis and processing of ceramic materials, composite and nanocomposite ceramics, as well as into the development of hybrid polymeric-ceramic materials with improved functionalities. Research topics involve innovative methods for synthesis and processing of materials, surface modification of ceramic powders, development of dense and porous materials for biomedical, mechanical and thermo-mechanical applications. In the frame of biomedical applications, the mostly investigated compositions are alumina-zirconia ceramics, zirconia-based composites, hydroxyapatite and calcium phosphate.<br>A wide range of characterization techniques are available, such as: simultaneous DTA-TG, uniaxial and differential dilatometry, low and high-temperature furnaces, Hg-porosimetry, particle size analyzer, mills (ball, attrition and planetary milling), spray dryer, freeze dryer, X-ray diffractometer, scanning electron microscope equipped with EDX, field emission scanning electron microscopy, facilities for the preparation of ceramic, polymeric and composites materials in the form of bulk-, porous- and films components. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Chemistry "Giacomo Ciamician", University of Bologna | | http://www.ciam.unibo.it/biomimetic |
| **2** | **Address** | | **Country** |
| | via Selmi 2, I - 40126 Bologna | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Elisa Boanini | +390512099548 | elisa.boanini@unibo.it |
| **4** | **Other members** | | |
| | Prof. Adriana Bigi, Dr. Silvia Panzavolta, Dr. Katia Rubini | | |
| **5** | **Keywords** | | |
| | Functionalized calcium phosphates, coatings, 3D scaffolds for bone tissue regeneration | | |
| **6** | **Abstract of activities** | | |
| | Design and preparation of innovative inorganic, polymeric and composite materials with tailored functional properties: calcium phosphates functionalized with bioactive ions and molecules; scaffolds for regenerative medicine, coatings, bone cements<br>Chemical and structural study of calcium phosphates of biological interest; biomimetic synthesis of functionalized nano- and micro-crystals; structural and morphological characterization through powder X-ray diffraction and scanning and transmission electron microscopy.<br>Structure-properties relationships in natural and synthetic polymers.<br>Development of calcium phosphate-based coatings of metallic, ceramic and polymeric implants; synthesis of new calcium phosphate bone cements loaded with biologically active molecules; design and synthesis of 3D porous scaffolds for bone tissue regeneration. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Chemistry "Giacomo Ciamician", University of Bologna | | http://www.ciam.unibo.it/polymers |
| **2** | **Address** | | **Country** |
| | via Selmi 2, I - 40126 Bologna | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Maria Letizia Focarete | +390512099548 | marialetizia.focarete@unibo.it |
| **4** | **Other members** | | |
| | Dr. Chiara Gualandi | | |
| **5** | **Keywords** | | |
| | 3D scaffolds for tissue regeneration, polymers, electrospinning, structure-properties relations, functionalization | | |
| **6** | **Abstract of activities** | | |
| | Within the broad area of polymeric materials, the Group has consolidated experience on the development, characterization and performance assessment of new macromolecular systems and on 'ad hoc' modification of state-of-the-art polymers. Properties of polymeric materials are controlled and tuned to fulfil the requirements for biomedical use. In particular, the Group's recognized expertise in structure-property correlations in both natural and synthetic polymeric materials is applied in the design of new polymeric biomaterials with tuned physical properties, bioresorption rate and functionalities.<br>Main research activities deal with:<br>- Design of the electrospinning process for the production of nanofibrous mats for tissue engineering applications<br>- Fabrication of scaffolds for tissue engineering with tunable architecture<br>- Functionalization of biomaterials by application of smart strategies (surface modification, incorporation of suitable biomolecules, 'ad hoc' synthesized functional polymers, etc.)<br>- Thermal, mechanical, rheological, morphological and structural characterization of polymeric systems. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Orthopaedic and Trauma Surgery<br>Campus Bio-Medico University of Rome | | http://www.unicampus.it/ |
| **2** | **Address** | | **Country** |
| | 200 Via Alvaro del Portillo 00128 Rome | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Gianluca Vadalà, MD, PhD<br>Orthopaedic and Trauma Surgeon | +3906225411192 | g.vadala@unicampus.it |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Orthopaedic Surgery, Spine Surgery, Spine fusion, Bone Biology, Sport Medicine, Bone Tumor | | |
| **6** | **Abstract of activities** | | |
| | The Department of Orthopaedic and Trauma Surgery of Campus Bio-Medico University of Rome is a clinical division<br>The Department of Orthopaedic Surgery and Traumatology is specialized on the surgical treatment in degenerative and traumatic deseases of the musculoskeletal system, in particular upper and lower limbs and spine surgery. The Department is directed by Prof. Vincenzo Denaro, worldwide known Spinal and Orthopaedic Surgeon. Indeed, the Department excels in Cervical and Lumbar Spine Surgery performing several cases each year. Moreover, the arthroscopic management of sport related trauma to the knee and the shoulder is another area of excellency, performing more than 1000 arthroscopic surgical procedures per year.<br>The surgical treatments are carried out on a regular inpatient admission or day surgery basis. The clinical and surgical cares applied to the patients follow the most updated scientific guidelines and the evidence based medicine. Many controlled clinical trials are performed in the Orthopaedic Department in the vision to ameliorate the surgical treatment of many diseases of the spine and limbs. A number of well cited and awarded research papers in the field of ACL reconstruction and shoulder instability and spine surgery documents the excellence of the Department in clinical research. As part of the Centre of Integrated Research, the treatment and research are approached with a multidisciplinary view in order to get new cutting age hypothesis and objectives to achieve the best results for the patients.<br>The Department is also equipped with a Laboratory of Regenerative Orthopeadic where basic and preclinical researches are performed. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | GLANCE – Glasses, Ceramics and Composites, Department of Applied Science and Technology Politecnico di Torino | | http://www.composites.polito.it |
| **2** | **Address** | | **Country** |
| | Corso Duca degli Abruzzi 24, 10129 Torino | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Chiara Vitale-Brovarone | +390110904716 | chiara.vitale@polito.it |
| **4** | **Other members** | | |
| | Dr. Enrica Verné, Dr. Silvia Spriano | | |
| **5** | **Keywords** | | |
| | bioactive and bioresorbable glasses, 3D-scaffolds, antibacterial properties, surface functionalisation, drug-delivery, biomaterial characterisation (micro-CT) | | |
| **6** | **Abstract of activities** | | |
| | GLANCE (Glasses, Ceramics and Composites), is part of the Institute of Materials Physics and Engineering (IMPE) at DISAT (Department of Applied Science and Technology) of Politecnico di Torino (POLITO).<br>We prepare and characterize "custom" glasses, glass-ceramics and their composites, in the form of bulk-, joining-, coating-, porous- , thin films- and fibre-materials.<br>In the frame of WG1, Politecnico di Torino_GLANCE group can exploit its know-how on:<br>* bioactive glasses, glass-ceramics and composites (powders, coatings, nanoparticles, 3D hierarchical scaffolds, fibers)<br>* mesoporous oxides and spherical mesoporous bioactive glasses for enhanced osteoinductivity and drug release applications<br>* new surface treatments to enhance the bioactivity of metallic materials<br>* antibacterial surfaces.<br>In particular for WG2 we can offer our consolidated experience on 3D-porous scaffolds for bone/cartilage regeneration (both bioactive/bioresorbable glasses and osteoconductive ceramics i.e. □-TCP, HAp, and their mixtures) produced with different techniques such as sponge replication method, burning out of a thermally removable phase, foaming and freeze drying, loose fibers sintering.<br>A wide range of fabrication and characterization techniques are available (Furnace for thermal treatment, DTA, DSC, DMA, XRD, microdiffraction, hot stage microscopy, SEM, FESEM, Sputtering, Micro-CT SkyScan 1174), together with the necessary expertise to discuss results and to propose solutions. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Institute of Science and Technology for Ceramics<br>National Research Council, ISTEC-CNR | | http://www.cnr.it/istituti/Descrizione_eng.html?cds=073 |
| **2** | **Address** | | **Country** |
| | Via Granarolo 64 48018 Faenza (RA) | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Simone Sprio | +39 0546 699759 | simone.sprio@istec.cnr.it |
| **4** | **Other members** | | |
| | Dr. Silvia Panseri | | |
| **5** | **Keywords** | | |
| | Synthesis and characterization of bioceramics for bone regeneration: biomimetic apatites, reinforced ceramic composites, macroporous bioactive ceramics, biomorphic transformations, bone cements for spinal surgery | | |
| **6** | **Abstract of activities** | | |
| | The request of biomimetic materials for regenerative medicine is strongly increasing due to the raising of the number of pathologies related to life-styles and the progressive ageing of the population.<br>The sectors of interest are orthopaedics, neurosurgery, maxillo-facial-dental and aesthetic surgery; in consequence of the loss of tissue due to traumas, degenerative pathologies or deformity, all these fields require bioactive and bio-resorbable scaffolds, able to be integrated by the human body, colonized by cells and remodelled so as to re-build the missing part of tissue.<br>Similarly, for the traditional prosthetic and dental sectors, new nano-structured materials are being developed, characterized by very low friction coefficient and very high resistance to fracture and wear.<br>Dr. Panseri has experience in stem cells, nanotechnology and tissue engineering. Assessment of in vitro cell viability and cell behaviour analysis (cell biology and molecular biology). In detail, expertise in cell---material interactions, in 3D cell culture and use of bioreactor for long term culture. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | University of Piemonte Orientale – Department of Health Sciences | | www.unipmn.it |
| **2** | **Address** | | **Country** |
| | Via Solaroli, 17 28100 Novara | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Lia Rimondi | + 39 0321 660673 | lia.rimondini@med.unipmn.it |
| **4** | **Other members** | | |
| | Dr. Barbara Azzimonti, Dr Andrea Cochis, Dr. Elena Varoni, Dr. Enrico Catalano | | |
| **5** | **Keywords** | | |
| | Bone biology, biocompatibility, immuno-response, biofilm, dental materials oral implant | | |
| **6** | **Abstract of activities** | | |
| | Development of material for oral implantology. Development and characterization of nano-delivery systems for drugs and genes.<br>In-vitro characterization of biocompatibility of biomaterials and devices with cells cultures, organotypic cells cultures, static and dynamic conditions.<br>Expertise in microbiological analysis. In-vivo tests, histology and in vivo imaging. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Laboratory for Orthopaedic Pathophysiology and Regenerative Medicine - Rizzoli Orthopaedic Institute | | http://www.ior.it/en/laboratori/lab-di-fisiop-ortop-med-rig/laboratory-orthopedic-pathophysiology-and-regenerative-medicine |
| **2** | **Address** | | **Country** |
| | Via di Barbiano, 1/10 - 40136 Bologna | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Gabriela Ciapetti | +390516366896 | gabriela.ciapetti@ior.it |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Preclinical and clinical studies, orthopaedic pathology, biocompatibility, regenerative medicine | | |
| **6** | **Abstract of activities** | | |
| | The Rizzoli Orthopaedic Institute, founded in 1896, is a medically guided public Institute specialized in the treatment of disorders and trauma of the musculoskeletal system, as well as in the scientific research about orthopaedics. The Institute is also a teaching site for orthopaedics and rehabilitation of the University of Bologna, Alma Mater Studiorum.<br>The SSD 'Laboratory for Orthopaedic Pathophysiology and Regenerative Medicine' has an established expertise in preclinical research on materials for bone, that is in vitro testing, using human cells or tissues, of biomedical materials for bone healing or substitution.<br>Current research issues include:<br>- new biological strategies to promote bone tissue healing, characterization and activities of primary osteoblasts and osteoclasts, monitoring of metal ion release from implants, biological aspects of cell therapy within clinical trial for osteonecrosis (under Orthopaedic Pathophysiology theme)<br>- recognition of regenerative potential of adult mesenchymal cells, study of the cell/ micro- and nano-structured substrate interactions, optimization of expansion or differentiation of human bone marrow stromal cells, study of cell/extracellular matrix interaction, resorption of CaP substrates by osteoclasts (under Regenerative Medicine theme).<br>Expertise and study protocols of the Lab may be applied to better understand material effects on cells and, conversely, cell activities on materials. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Laboratory of Preclinical and Surgical Studies - Rizzoli Orthopaedic Institute | | http://www.ior.it/en/laboratori/lab-studi-precli-chirurg/laboratory-preclinical-and-surgical-studies |
| **2** | **Address** | | **Country** |
| | Via di Barbiano, 1/10 - 40136 Bologna | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Milena Fini<br>Director | +39-051-6366787 | milena.fini@ior.it |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | In vitro and in vivo research, biomaterials, scaffolds | | |
| **6** | **Abstract of activities** | | |
| | The mission of the Laboratory is to conduct in vitro and in vivo research on the musculo-skeletal system with a huge experience in the study of biomaterials and scaffolds.<br>Staff: 3 Medical Doctors, 8 Biologists/Biotechnologists, 1Veterinarian 5 Technicians, 1 Administrative | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Medical Technology Laboratory - Rizzoli Orthopaedic Institute | | http://www.ior.it/en/laboratori/lab-di-tecnolog-medica/medical-technology-laboratory |
| **2** | **Address** | | **Country** |
| | Centro di Ricerca Codivilla-Putti, via di Barbiano, 1/10 - 40136 Bologna | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Tribology, hip and knee wear tests, debris characterisation, metallurgical analyses | | |
| **6** | **Abstract of activities** | | |
| | Istituto Ortopedico Rizzoli (IOR) is one of the oldest hospitals in Europe totally dedicated to orthopaedics and is the main Italian institute of orthopaedics and traumatology. In 1981, IOR was given the status of a “scientific research hospital” due to its high level of healthcare and it is now the National Reference Centre for orthopaedic research and clinical practice of the Italian Ministry of Health. The IOR’s scientific research is carried out in nine laboratories on the campus, employing a staff of 250 including doctors, biologists, engineers, physicists and technicians. The research is organized around six thematic principles: oncology; reconstructive prosthetic surgery; computer-aided medicine; musculoskeletal regenerative medicine; orthopaedics and traumatology; orthopaedic pathology. At IOR, the Laboratorio di Tecnologia Medica (LTM) has the mission to develop, validate and transfer every useful innovative technology to orthopaedic clinical practice as quickly as possible. The lab has a staff of approximately 40 people, including senior and junior researchers as well as graduate and undergraduate students. LTM has been involved in many recent European projects, including several in which it has acted as Project or Scientific Coordinator. The Tribology Research Group, directed by Saverio Affatato, characterizes the friction, lubrication and wear of joint prostheses and synthetic biomaterials. The group has strong expertise in hip and knee wear tests, debris characterization, metallurgical analyses. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Università degli Studi di Genova | | www.unige.it |
| **2** | **Address** | | **Country** |
| | Largo R. Benzi 10 Genoa | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Maddalena Mastrogiacomo | +390105558203 | maddalena.mastrogiacomo@unige.it |
| **4** | **Other members** | | |
| | Ranieri Cancedda | | |
| **5** | **Keywords** | | |
| | Mesenchymal stem cells, bioactive scaffolds, regenerative medicine, cartilage, bone | | |
| **6** | **Abstract of activities** | | |
| | The main research projects presently carried on by the Laboratory of Regenerative Medicine:<br>*1)* Biology of mesenchymal stem/progenitor cells from bone marrow and other connective tissues (differentiation, plasticity, senescence) and from amniotic fluid<br>*2)* Molecular biology of mesenchymal and amniotic fluid derived stem/progenitor cells (identification of genes markers of the early differentiation stages and of genes expressed during cell differentiation)<br>*3)* Platelet growth factors components : identification and characterization of platelets derived component as cell culture supplement; differentiative effect of platelets derived component on mesenchymal stem cell population; in vivo bone and cartilage regeneration<br>*4)* Tissue engineering for cartilage and bone repair<br>- Active synthetic and natural polymers and co-polymers that can be colonized by chondrogenic cells and implanted. Injectable hydrogels seeded with chondrogenic cells and growth factors.<br>- Ceramic based scaffolds that can be colonized by osteogenic cells and implanted. Resorbable porous bioceramics. 3D cocoltures of bone depositing and bone resorbing cells<br>- Repair and regeneration of cartilage and bone tissue: small and large animal models.<br>- Structural and biomechanical analysis of engineered tissues.<br>- Cartilage and bone regeneration: new indications for the employment of engineered tissues in phase I and phase II clinical trials.<br>*5)* Osteobiology in microgravity: Effect of physical forces, including microgravity on bone<br>Most of these projects are being carried out in collaboration with other university departments, research centres and companies. Many international collaborations have been also set up in this field. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG3 : Functionalization of implants for improved functional and therapeutic effects<br>WG4 : In vitro evaluation of the performance | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Università degli Studi di Trieste | | http://www.units.it/ |
| **2** | **Address** | | **Country** |
| | Piazzale Europa,1 - 34127 Trieste | | Italy |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Antonella Bandiera | +390405583679 | abandiera@units.it |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Biomimetic materials, elastin, recombinant proteins, hydrogel matrix | | |
| **6** | **Abstract of activities** | | |
| | Research interest is focused on the production of customized non-natural protein polymers. Exploiting the expertise in recombinant DNA technology and protein expression in prokaryotic organisms, the creation of artificial genes coding for bio-inspired polypeptides modeled after elastin was undertaken. Repetitive artificial polypeptides based on the most structurally regular, entirely naturally occurring region of the human tropoelastin have been produced. These protein polymers named HELPs (Human Elastin-Like Polypeptides) show specific folding propensities, controlled composition and length. They retain several peculiar biophysical features of elastin as, for example, the reversible inverse phase transition, a process related to the variation in the aggregation state in response to temperature rise.<br>The functionality of these biopolymers can be even extended by addition of functional, bioactive domains, improving the potential of the resulting product. The smart nature of this class of compounds makes them attractive for many applications in the biomedical and biotechnological fields, in particular for biomaterial development. Their employment as smart coating agents or as basic components for realization of biomimetic scaffolds can be envisaged. A method of preparation of HELP-based 3D has already been patented. Collaborations with several groups at international level are ongoing, in particular with prof. Cerruti (McGill University, Canada), prof. Mantovani (Laval university, Canada), dr. Stamboulis (Birmingham University, UK), prof. Milosev (Valdoltra Orthopaedic Hospital, Slovenia), dr. Ciofani (IIT, Pontedera, Italy), dr. Focarete (Università di Bologna, Italy). | | |
| **7** | **Involvement in NEWGEN** | | |
| | The features of materials inspired to elastin are particularly suitable for the design and realization of materials that can be successfully employed for bone tissue engineering and for the realization of innovative coatings for implants. The biomaterials that can be derived from biomimetic elastin polypeptides combine several favourable aspects that can be found in natural and synthetic such as biocompatibility as well as reproducibility and standardization. There are many other valuable opportunities to exploit this material in the context of bone regeneration, especially to realize new bioactive interfaces between the tissue and implant that can definitely improve the response of the biological system. This will lead to the realization of a new generation of medical devices that will possess a better integration capacity respect that shown by the implants currently used. Moreover, being elastin prone to mineralization under some specific circumstances , elastin-based materials can be exploited for their capacity to promote hydroxyapatite formation, offering the appealing chance to obtain mineralized matrices that mimic the bone physiologic environment.<br>The biomimetic elastin materials offer also a new and still unexplored perspective of improving basic knowledge of physio-pathological mechanisms at molecular level due to their simplified primary structure that allow to adopt a reductionist approach.<br>The knowledge and expertise developed at university of Trieste in biomimetic elastin compounds can well contribute added value to the NEWGEN. Joining the other members will allow to spread the knowledge and the potential of this research in the context of bone engineering as well as to create new synergies through complementary expertise and unmet medical needs.<br>WG1 : Design and Synthesis of New Materials<br>WG3 : Functionalization of implants for improved functional and therapeutic effects | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dept. Life Sciences and Biotechnology<br>University of Ferrara | | http://sveb.unife.it/it<br>www.biomaterials.it |
| **2** | **Address** | | **Country** |
| | Via Fossato di Mortara 17, 44121, Ferrara | | ITALY |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Claudio Nastruzzi | +39-0532-455348 | nas@unife.it |
| **4** | **Other members** | | |
| | Stefania Mazzitelli | | |
| **5** | **Keywords** | | |
| | Biomaterials, biofabrication, cell embedding, microparticles, nanomedicine, drug delivery | | |
| **6** | **Abstract of activities** | | |
| | | | |
| **7** | **Involvement in NEWGEN** | | |
| | Pending member of the WG2 (Manufacturing and characterization of 3D porous scaffolds) and WG3 (Functionalization of implants for improved functional and therapeutic effects). | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Clothing and Polymeric Products Technology<br>Faculty of Design and Technology, Kaunas University of Technology | | http://en.ktu.lt/content/research/subdepartment/489 |
| **2** | **Address** | | **Country** |
| | Studentų str. 56 - 51424 Kaunas | | Lithuania |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Virginija Jankauskaite | +37037300207 | virginija.jankauskaite@ktu.lt |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Textile materials, polymer | | |
| **6** | **Abstract of activities** | | |
| | Evaluation of virtual and real garment fit using different textile materials;<br>Investigation and evaluation of woven structure‘s formability;<br>The investigation of relaxation behaviour of multilayer textile materials;<br>Deformation behaviour of knitted materials under biaxial tension;<br>The investigation of relaxation behaviour of flexible polymer materials;<br>Creep and creep recovery behaviour of textile fabrics and their fused systems;<br>Stress relaxation of heterogeneous textile fabric systems;<br>Pilling of knitted materials. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Maxillofacial Surgery<br>Lithuanian University of Health Sciences | | http://lsmuni.lt/en/structure/medical-academy-/faculty-of-odontology-/departments/ |
| **2** | **Address** | | **Country** |
| | Eiveniu 2 - Lt-50009 Kaunas | | Lithuania |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Gintaras Juodzbalys | +370 37 323153 | gintaras@stilusoptimus.lt |
| **4** | **Other members** | | |
| | Dr. Povilas Daugela (p.daugela@gmail.com; +37060061999) , Dr. Arturas Stumbras, Dr. Julius Maminskas, Dr. Mindaugas Pranskunas | | |
| **5** | **Keywords** | | |
| | Oral and maxillofacial surgery, bone plastic, cellulose bone scaffold, stem cells | | |
| **6** | **Abstract of activities** | | |
| | Experience using bone plastic materials in oral and maxillofacial surgery. The combination of bone plastic materials with mesenchymal stem cells, platelet rich concentrates. Composite cellulose bone scaffold synthesis and investigations. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Dr. Povilas Daugela : Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Textile Technology<br>Faculty of Design and Technology, Kaunas University of Technology | | http://en.ktu.lt/content/research/subdepartment/493 |
| **2** | **Address** | | **Country** |
| | K. Donelaičio St. 73-422, LT-44029 Kaunas | | Lithuania |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Sigitas Stanys | +370 37 300201 | sigitas.stanys@ktu.lt |
| **4** | **Other members** | | |
| | Dr. Erika Adomaviciute, Dr. Kristina Zukiene, Agne Matuseviciute | | |
| **5** | **Keywords** | | |
| | Functional nano- and micro-textiles, antibacterial treatment | | |
| **6** | **Abstract of activities** | | |
| | Manufacture and investigation of functional nano-, micro-textiles;<br>Investigation of flammability and comfortability of flameretardant textiles;<br>Influence of structure parameters on end-use properties of woven fabrics;<br>Creation of complex yarns;<br>Evaluation and creation of woven fabrics;<br>Investigation of antibacterial treatment influence on end-use properties of knits;<br>Investigation of thermofunctional properties of textiles;<br>Formation and investigation of medical nano/micro textiles with multifunctional nanoparticles;<br>Investigation of nanofibres with polysaccharides;<br>Investigation of compression properties of 3D knitted orthopaedic supports;<br>Creation and evaluation of structures from nanofibres;<br>Investigation and manufacturing of textiles from nanofibres;<br>Ethno-cultural investigation of textile heritage. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Rudolfs Cimdins Riga Biomaterials Innovations and Development Centre, Institute of General Chemical Engeneering,<br>Riga Technical University | | www.rtu.lv |
| **2** | **Address** | | **Country** |
| | Pulka street 3/3, Riga LV-1007 | | Latvia |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Assoc. Prof. Janis Locs<br>Lead researcher, vice director of institute | +371 26437878 | janis.locs@rtu.lv |
| **4** | **Other members** | | |
| | Dr. Girts Salms, Riga Stradins University | | |
| **5** | **Keywords** | | |
| | Synthesis of calcium phosphates and ceramics, composite materials, calcium phosphate bone cements, drug delivery | | |
| **6** | **Abstract of activities** | | |
| | Synthesis of calcium phosphates and ceramics, composite materials, calcium phosphate bone cements, drug delivery. Synthesis of substituted calcium phosphates. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee : Dr. Janis Locs – Janis.locs@rtu.lv<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Restorative Dentistry<br>Faculty of Dental Surgery - University of Malta<br>Medical School<br>Mater Dei Hospital | | |
| **2** | **Address** | | **Country** |
| | MSD 2090 msida | | Malta |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Josette Camilleri | +35623401174 | josette.camilleri@um.edu.mt |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Biomaterials, construction materials, bioactivity, characterization, material synthesis | | |
| **6** | **Abstract of activities** | | |
| | My main research activities are mainly cement chemistry and the use of Portland cement as a biomaterial. I have investigated the use of Portland cement in the construction industry and the interaction of wastes with the cement system. This research has been extrapolated further to look into the interaction of the Portland cement with the human tissues from cellular level to in vitro and in vivo investigations.<br>I am looking into the synthesis of new materials with particular properties to interact with both tooth structure and bone. These materials will be characterized and the physical, chemical and biological properties investigated. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | DMME - University of Malta | | http://www.um.edu.mt/eng/mme/people/mallia |
| **2** | **Address** | | **Country** |
| | MSD 2080, Msida | | Malta |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr Bertram Mallia | +35623402057 | bertram.mallia@um.edu.mt |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Corrosion-wear; tribocorrosion; PVD coatings; Biomaterials | | |
| **6** | **Abstract of activities** | | |
| | My main research activity is the tribocorrosion evaluation of surface engineered metallic biomaterials.<br><br>I developed novel metallic/ceramic coatings using magnetron sputtering for tribological applications. This research involves surface treatment, materials characterisation (LOM, SEM, EDX, XRD) and testing (corrosion-wear; corrosion; nano scratching / indentation). Currently work is ongoing in assessing the synergism between mechanical and chemical degradation of coated biomaterials in simulated body fluid. The goal is to develop surface layers to mitigate degradation and hence increase their durability. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dept of Metallurgy & Materials Engineering<br>Faculty of Engineering - University of Malta | | http://www.um.edu.mt/eng/mme/people/buhagiar |
| 2 | Address | | Country |
| | Msida, MSD 2080 | | Malta |
| 3 | Contact Person | Telephone | E-mail |
| | Dr Joseph Buhagiar | +35623402439 | joseph.p.buhagiar@um.edu.mt |
| 4 | Other members | | |
| | | | |
| 5 | Keywords | | |
| | Biomaterials, Surface Engineering, Biocompatibility, Corrosion, Tribo-Corrosion | | |
| 6 | Abstract of activities | | |
| | My main research activity is the surface engineering of metallic biomaterials used in orthopaedic applications such as: austenitic stainless steel, Cobalt-Chromium alloys, Titanium alloys and Nickel-Titanium Shape Memory alloys.<br><br>I have conducted research in material characterisation (XRD, SEM, EBSD), material testing (Nano-indentation, corrosion, corrosion-wear and biocompatibility) and surface engineering (plasma surface alloying). My current research direction is in the creation of long lasting orthopaedic implants utilising surface engineering techniques. The main aim of my current research is to alleviate the problems, in terms of rejection, of Co-Cr-Mo metal-on-metal hip joint replacement. | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Biomaterials<br>Radboud University Nijmegen Medical Center | | http://www.biomaterials-umcn.nl |
| **2** | **Address** | | **Country** |
| | Ph. van Leijdenlaan 25 Room 1.34 (route 327), 6525 EX Nijmegen | | The Netherlands |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Jeroen JJP van den Beucken | +31 (0)24 366 7305 | j.vandenbeucken@dent.umcn.nl |
| **4** | **Other members** | | |
| | Prof. J. Jansen | | |
| **5** | **Keywords** | | |
| | Biological and Pre-clinical evaluation, bone regeneration and bone implantology, pre-clinical models | | |
| **6** | **Abstract of activities** | | |
| | Biomaterials and Regenerative Medicine with special focus on bone regeneration and bone implantology; effects of material optimization (surface modifications, degradation properties, delivery of biologicals) in cell culture and pre-clinical models.<br>Development, characterization and biological/(pre-)clinical evaluation of biomaterials for bone applications. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Ft Innovations B.V. | | http://ftinnovations.nl/ |
| 2 | Address | | Country |
| | Braamsluiper 1 - 5831 PW Boxmee | | The Netherlands |
| 3 | Contact Person | Telephone | E-mail |
| | Dr. Saber Amin Yavari | +33(0)1 69 09 77 85 | Saber.aminyavari@ftinnovations.nl |
| 4 | Other members | | |
| | Prof. Peter Leerkamp | | |
| 5 | Keywords | | |
| | Biomaterials, characterisations, tissue biomechanics, implants, surface engineering | | |
| 6 | Abstract of activities | | |
| | Ft Innovations was founded in July 2004 by Mr. Peter Leerkamp. The company is active in the textile printing sector, the graphic arts printing market and the orthopedic market.<br>Ft Innovations is specialized in the production of metal, plastic and composite materials.<br>Research activities:<br>Processing, Characterization and Properties of Biomaterials<br>Tissue Biomechanics and Implants<br>Coatings, Overlays and Surface Engineering<br>Static and Dynamic Mechanical Properties of Biomaterials | | |
| 7 | Involvement in NEWGEN | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Norwegian University of Science and Technology<br>Department of Physics | | http://www.ntnu.edu/physics/bionano |
| **2** | **Address** | | **Country** |
| | Department of Physics<br>Høgskoleringen 5<br>N-7491 Trondheim, Norway | | Norway |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | David Bassett | | |
| **5** | **Keywords** | | |
| | Biomaterials, material characterization, microscopy, biomineralization, hydrogels, materials for tissue engineering | | |
| **6** | **Abstract of activities** | | |
| | We work in the field of soft biomaterials and focus on fabrication of composites with hierarchical structure through bio-inspired mineralization of hydrogels. The aim is to develop new materials for tissue engineering applications through understanding of mineralization process and the control of the mineral phase. We investigate methods to modify mechanical propertis of hydrogel materials, through toughening mechanisms inspired by those found in nature. We use a multidisciplinary material science and fabrication approach, as well as study cellular response by application of developed materials to proof-of-principle studies with biological model systems. The main challenge in making materials which mimic complex tissue is in control of the structure on different length scales, from nm to mm. We propose to achieved this by a combination of engineering, micro-fabrication, molecular self-assembly and mineral deposition controlled by molecular interactions. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Our involvement in NEWGEN will be primarily focused on the design and characterisation of new scaffold materials, particularly at the nanoscale. We bring a wealth of knowledge and expertise regarding biopolymer based bone tissue engineering scaffolds and will use this to help achieve the primary goal of the project.<br>MC + MC substitute | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Biomaterials - Institute for Clinical Dentistry, University of Oslo | | www.biomaterials.no |
| **2** | **Address** | | **Country** |
| | PO Box 1109 Blindern<br>NO-0317 Oslo, | | Norway |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Assoc. Prof Håvard J. Haugen | + 47 91 64 16 10 | h.j.haugen@odont.uio.no |
| **4** | **Other members** | | |
| | Dr Hanna Tiainen, hannati@odomt.uio.no MC substitute | | |
| **5** | **Keywords** | | |
| | Scaffold, TiO2, porous materials, titanium, titanium alloy, surface coating, surface modification, | | |
| **6** | **Abstract of activities** | | |
| | I am currently interested in porous material, in particular titanium dioxide for bone engineering applications. In addition I do also work on surface modification of dental implant surface and functionalization with biomolecule of such surface. Previously I have work with porous polyurethanes | | |
| **7** | **Involvement in NEWGEN** | | |
| | I would like to extend my research collaboration I the EU state and find partner with common research interests | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Norwegian University of Science and Technology (NTNU) | | www.ntnu.edu |
| **2** | **Address** | | **Country** |
| | Department of Physics (Biophysics)<br>Realfagbygget, Høgskoleringen 5<br>Trondheim, 7491 | | Norway |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. David Bassett | Office :<br>+47 735 93353<br>Mobile :<br>+47 410 68283 | david.bassett@ntnu.no |
| **4** | **Other members** | | |
| | Prof. Pawel Sikorski | | |
| **5** | **Keywords** | | |
| | nanomaterials, biomaterials, alginate, characterisation, cell arrays, cell patterning, bone, tissue engineering, encapsulation, biopolymers, biotechnology, bionanotechnology. | | |
| **6** | **Abstract of activities** | | |
| | The Bionanotechnology group at NTNU was started in 2006 as part of the NTNU NanoLab initiative, an effort to bring several branches of nanotechnology together in one lab. The NanoLab provides state of the art nanomaterial characterisation and synthesis equipment, all housed in a cleanroom environment.<br><br>The Bionanotechnology research team is also part of the broader research group in Biophysics and Medical Technology and enjoys functional collaborations with complementary research groups at NTNU in Biotechnology, Engineering and Medicine. We study the interactions between biological systems and nanostructured surfaces, using biological starting materials and taking inspiration from biological design to develop fabrication principles for application in medicine and biotechnology. Specifically we work on the synthesis and characterisation of biopolymer-based nanostructures, particularly for cell biology and tissue engineering applications. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Our involvement in NEWGEN will be primarily focused on the design and characterisation of new scaffold materials, particularly at the nanoscale. We bring a wealth of knowledge and expertise regarding biopolymer based bone tissue engineering scaffolds and will use this to help achieve the primary goal of the project. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Biopolymer Research Group<br>Faculty of Chemistry<br>Nicolaus Copernicus University | | http://www.umk.pl/en |
| 2 | Address | | Country |
| | ul. Gagarina 7, 87-100 Toruń | | Poland |
| 3 | Contact Person | Telephone | E-mail |
| | Prof. Alina Sionkowska | +48 56 6114547 | as@chem.uni.torun.pl |
| 4 | Other members | | |
| | | | |
| 5 | Keywords | | |
| | Chemistry, polymers, biopolymers, biomaterials, cosmetics | | |
| 6 | Abstract of activities | | |
| | Extraction of collagen from several sources, collagen structure and properties, Photodegradation of collagen, Collagen structure in leather, Photodegradation of chitosan, Photodegradation of elastin, Photodegradation of silk, Photodegradation of cellulose, Photopolymerization of monomers for dental applications, Kinetics of photopolymerization, Polymer blends, Miscibility of polymers, New materials based on the blends of collagen and synthetic polymer (PVP, PVA, PEO, PEG, PAA), New materials based on the blends of collagen and chitosan, Crosslinking of natural and synthetic polymers, New materials based on the blends of chitosan and silk, Keratin and its hydrolysates, Micro- and nanocomposites of collagen and hydroxyapatite, Micro- and nanocomposites of chitosan and hydroxyapatite, Biopolymeric films and sponges for biomedical applications, Polymeric biomaterials, Laser modification of polymer surface and laser ablation, Modification of biopolymers for cosmetic application, Changes of collagen structure in disc diseases, Thermal stability of polymers and biopolymers, Biomaterials, bioengineering, biocompatibility, biodegradation, Flash photolysis of collagen and other biopolymers, Pulse radiolysis of collagen and other biopolymers, Cosmetic raw materials, Formulation of cosmetics | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Nicolaus Copernicus University, Faculty of Chemistry | | http://www.umk.pl/en |
| 2 | Address | | Country |
| | ul. Gagarnia 7, 87-100 Toruń | | Poland |
| 3 | Contact Person | Telephone | E-mail |
| | Dr Katarzyna Lewandowska | +48566114551 | reol@chem.umk.pl |
| 4 | Other members | | |
| | Professor Alina Sionkowska, Dr. Aleksandra Radtke, Prof. Piotr Piszczek | | |
| 5 | Keywords | | |
| | chitosan, biocomposites, montmorillonite, nanoclay, polymer blend | | |
| 6 | Abstract of activities | | |
| | The aim of our studies is to prepare and investigate the properties of new materials containing biopolymers, such as chitosan, carboxymethylcellulose. The physico – chemical properties of biopolymer composites are important from both scientific and practical points of view. I am investigating the physico - chemical properties and the miscibility of chitosan blends with synthetic polymers {poly(vinyl alcohol), poly(N-vinylpyrrolidone), polyacrylamide} and/or inorganic compounds {different types of nanoclays} by using thermal measurement (DSC, DMA, TGA), microscopy (SEM, AFM), FTIR analysis, rheology and viscosity measurements. The blends composed of chitosan with nanoclay and/or synthetic polymers have been prepared as material designed for biomedical applications or/and cosmetic industries. The knowledge of properties of blends prepared from natural and synthetic polymers is important for their use in biomedical applications. | | |
| 7 | Involvement in NEWGEN | | |
| | Working group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Biomaterials Group, Materials Design Division<br>Faculty of Materials Science and Engineering<br>Warsaw University of Technology | | http://www.inmat.pw.edu.pl/ |
| **2** | **Address** | | **Country** |
| | 141 Woloska Str., 02-507 Warsaw | | Poland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Wojciech Swieszkowski | +48 228499407<br>ext.203 | wswieszk@inmat.pw.edu.pl |
| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Manufacturing of scaffoldings for tissue engineering, Biomaterials degradation, Nanocrystalline titanium, Surface modification of metallic implants using chemical methods, Shoulder prosthetics, Ceramic-polymer composites for dental fillings | | |
| **6** | **Abstract of activities** | | |
| | The faculty of Materials Engineering of the Warsaw University of technology is one of the leading research & development centres in Poland in the area of materials science and materials engineering. According to a parametric assessment conducted by the Ministry of Science & Higher Education, the Faculty is a 1st class unit ranked 1st in the classification of units carrying out research in chemistry and materials' mechanics.<br>The faculty has full academic qualifications and leads PhD and assistant professorship studies for own academic staff and for academics from Poland and abroad. So far we have promoted 148 PhDs (9 in 2007), 25 assistant professors (3 in 2007) and submitted 19 applications for Professor titles. The Scientific Council comprises 26 ordinary members and 8 with an advisory vote (Professors Emeriti).<br>The research and development activities of the Faculty are carried out by 35 educational and didactic staff, including 7 Full and 8 Assistant Professors, 38 technical staff, including 14 Doctors of Technical Sciences and 77 PhD students. The administrative and financial services are provided by administrative staff (14 people).<br>Research is financed from statutory funding and from projects commissioned by the Ministry of Science and Higher Education. Significant resources come from the EU (within the 6th and 7th Framework Programmes) and from industrial partners (see Drawing 1). In 2008 we carried out 62 MNiSW research projects, including 8 promotion projects, 42 own research projects and 12 development projects. We also participate in conducting bespoke research projects (25 tasks within 11 bespoke projects in 2007) and targeted projects (8 in 2007). | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Laboratory of Nanostructures for Photonic and Nanomedicine<br>Institute of High Pressure Physics<br>Polish Academy of Sciences | | http://w3.unipress.waw.pl/nano/ |
| **2** | **Address** | | **Country** |
| | Sokołowska 29/37, 01-142 Warszawa | | Poland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Nanopowder synthesis, solvothermal technology, characterisation of ceramic nanopowders | | |
| **6** | **Abstract of activities** | | |
| | Our mission and specialization is nanopowders synthesis and its practical applications. Microwave-solvothermal technology, which we developed, enables us to produce nanomolecules of high purity and with narrow particle size distribution.<br>Our technology is flexible and may be customized to clients needs. We have been developing our solvothermal technology for over 10 years.<br>Our team possesses extensive know-how relating to research, structure, measurement and design.<br>We have state-of-the-art equipment, thanks to which we can investigate and analyse: Nanopowders morphology, Density measurements, Specific Surface Area measurements, Surface tension measurements, Phase composition, Crystal Size.<br>The reactors for microwave-solvothermal synthesis, which we constructed, are worldwide unique. We produce: zinc oxide, zirconium oxide and hydroxyapatite nanopowders. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Rapporteur for the Action | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Warsaw University of Technology, Faculty of Materials Science and Engineering | | http://www.pw.edu.pl/<br>http://bio.materials.pl/ |
| **2** | **Address** | | **Country** |
| | 141 Woloska Str.<br>02-507 Warsaw<br>Poland | | Poland |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Barbara Ostrowska | +48 22 662 31 58 | bostrowska@gmail.com |
| **4** | **Other members** | | |
| | - | | |
| **5** | **Keywords** | | |
| | Rapid prototyping, Scaffold manufacturing, Material characterization, Mechanical properties, Bioresorbable polymers, Composites for bone tissue regeneration, Tissue engineering, Materials Science | | |
| **6** | **Abstract of activities** | | |
| | My background is materials science and engineering and currently I work with Prof. Swieszkowski (I'm his MC substitute) in Biomaterials Group, Faculty Materials Science and Engineering, Warsaw University of Technology. The topic of my PhD work is "Investigation of the influence of the internal architecture on biological and mechanical properties of 3D fiber deposited scaffolds for bone tissue engineering applications".<br>In Biomaterials Group I work with 3D printers (Rapid Prototyping systems – I design, manufacture and characterize rapid prototyped structure). I have an experience with scaffold manufacturing and there mechanical and biological characterization. My work belongs to the interdisciplinary sciences field, which combine medical science with engineering. Before object is printing I start with model design and for this purpose I use CAD/CAM computer program, which give me opportunity to create medical implants. I am responsible for designing and development implants of biodegradable polymeric or composite for in vitro and in vivo studies, I also conduct full of characterisation of mechanical and biological properties of fabricated structures. | | |
| **7** | **Involvement in NEWGEN** | | |
| | MC substitute of prof. W. Świeszkowski | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Nicolaus Copernicus University, Faculty of Chemistry | | www.umk.pl |
| 2 | Address | | Country |
| | Gagarina 7 | | Poland |
| 3 | Contact Person | Telephone | E-mail |
| | Aleksandra Radtke | +48-600321294 | aradtke@umk.pl |
| 4 | Other members | | |
| | | | |
| 5 | Keywords | | |
| | antibacterial/antifungal coatings, dental implants, chemical vapor deposition, thin films, $TiO_2$, $ZrO_2$, Ag nanoclusters | | |
| 6 | Abstract of activities | | |
| | I am involved in research on the new generation dental implants and work on the antibacterial/antifungal coatings for medical devices. These coatings have a character of thin films obtained by chemical vapor deposition method. I am a member of COST Action MP1005 NAMABIO (From NAno to MAcro BIOmaterials - design, processing, characterization, modelling - and applications to steam cells regenerative orthopedic and dental medicine). | | |
| 7 | Involvement in NEWGEN | | |
| | WG1<br>WG3 | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | International Centre of Electron Microscopy for Materials Science & Faculty of Metals Engineering and Industrial Computer Science<br>AGH University of Science and Technology | | http://www.tem.agh.edu.pl |
| **2** | **Address** | | **Country** |
| | Al. Mickiewicza 30, PL-30 059 Krakow | | POLAND |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Dr Aleksandra Czyrska-Filemonowicz | +48 12/ 617 2929 | czyrska@agh.edu.pl |
| **4** | **Other members** | | |
| | Dr Urszula Stachewicz (ustachew@agh.edu.pl)<br>MSc. Joanna Karbowniczek (jkarbow@agh.edu.pl) | | |
| **5** | **Keywords** | | |
| | Metallic implants, ceramic coatings on titanium alloys, polymer nanofibers, 3D tomography (FIB-SEM) | | |
| **6** | **Abstract of activities** | | |
| | IC-EM team is experienced in the field of biomaterials characterisation, especially metallic based implants for hard tissues replacement. With the recent developments in biomaterials science also the research area in our team is expanding to manufacture and characterization of tissue scaffolds and ceramic coatings on titanium alloys.<br>Research area : - biomaterials and nanomaterials for tissue scaffolds applications, mainly polymeric nanofibres and their composites produced by electrospinning methods,<br>- rough and porous protective coatings deposited by micro-arc oxidation (and other surface processing methods) on titanium alloys.<br>The team has experience in 3D imaging using FIB-SEM tomography (focused ion beam - scanning electron microscope) of nanofiber scaffolds, which is used for visualization of integration of cells and network of fibres. The technique allows to quantify a spacing between fibres and analyse porosity influence on cell proliferation and integration with nanofibre scaffolds. These imaging techniques therefore provide unprecedented nanoscale imaging resolution using combined scanning electron and ion beam microscopies. This 3D tomography can be also used as a complementary method to X-ray micro computed tomography (µCT) at submicron level.<br>Moreover, we perform quantitative characterization of macro-, micro- and nanostructure of various biomaterials using light- and electron microscopy techniques (including high resolution analytical TEM) down to atomic level using most modern electron microscopes (resolution of 70pm) as well as surface analyses using AFM.<br>Our newly opened in vitro cell Laboratory provides facilities for basic biocompatibility investigations with cell lines. It is equipped with: CO2 incubator, laminar flow chamber, liquid nitrogen dewars, fridge/freezer (-20°C), sterilizer, benchtop centrifuge, inverted light microscope with fluorescence, micro plate reader, etc. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG2 member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Departamento de EngªMateriais e Cerâmica<br>CICECO<br>Universidade de Aveiro | | www.ciceco.ua.pt/ |
| **2** | **Address** | | **Country** |
| | Complexo de Laboratórios Tecnológicos<br>Campus Universitário de Santiago, 3810-193 Aveiro | | Portugal |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Maria Margarida Tavares Lopes de Almeida | +351-234370260 | margarida@ua.pt |
| **4** | **Other members** | | |
| | Prof. Maria Elizabete Jorge Vieira da Costa, Prof. Maria Helena Figueira Vaz Fernandes | | |
| **5** | **Keywords** | | |
| | Calcium phosphate nanoparticles and composites, drug delivery, bioglasses | | |
| **6** | **Abstract of activities** | | |
| | Tailoring calcium phosphate nanoparticles (nanoCP) and polymer/CaP macroporous composites scaffolds with suitable characteristics for application in bone regeneration and as drug delivery systems.<br>Oxides and composites with different dimensionality (1D, 2D, 3D) and properties for electronic and biomedical applications including ferroelectrics, piezoelectrics, nanoparticles, nanostructured ceramic/polymer composites for tissue engineering and sustained drug delivery.<br>Novel glass compositions for bone regeneration strategies. Glass-containing composites, polymer-nanoparticles composites for regenerative medicine. Films and 3D structures for tissue engineering. Drug loading and delivery. Piezoelectric platforms for tissue regeneration. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee+ Prof. Maria Elizabete Costa: Management Committee Substitute<br>Working Group member - WG1 + WG3 (Prof. Maria Helena Vaz Fernandes) | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Faculty of Pharmacy, Research Institute for Medicines-iMed.ULisboa | | http://imed.ulisboa.pt/ |
| 2 | Address | | Country |
| | Av. Prof. Gama Pinto, 1649-003 Lisbon | | Portugal |
| 3 | Contact Person | Telephone | E-mail |
| | Ana Bettencourt | +351919566267 | asimao@ff.ul.pt |
| 4 | Other members | | |
| | Ana Matos, António J. Almeida, Lídia Gonçalves, Inês S. Ferreira | | |
| 5 | Keywords | | |
| | Polymeric-nanoparticles, local-antibiotic-delivery, bone infections , biofilms, kinetic profiles, in vitro-testing | | |
| 6 | Abstract of activities | | |
| | Development and full characterization of innovative polymeric-nanoparticles (NPs) with controlled release properties and high anti-biofilm activity against relevant and multi-resistant pathogens in prosthetic-associated infections. Specifically, biomedical polymers with different degradation rates can be tailored to provide a suitable biphasic release profile. Full characterization of NPs includes assessing key parameters with impact on antibiotic release, such as drug loading and NPs size and distribution. Evaluation of anti-biofilm activity of NPs and their biological interaction with human cell lines, as well as its correlation with NPs significant properties, as surface charge and hydrophobicity. | | |
| 7 | Involvement in NEWGEN | | |
| | In WG3. Expertise: Development of polymeric NPs and assessment of in vitro release profiles of therapeutic drugs. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Fluidinova, Engenharia de Fluidos, S.A. | | www.fluidinova.com |
| 2 | Address | | Country |
| | TECMAIA - Parque de Ciência e Tecnologia da Maia<br>Rua Engº Frederico Ulrich, 2650, 4470-605 Moreira da Maia | | Portugal |
| 3 | Contact Person | Telephone | E-mail |
| | Dr. Paulo Quadros | +351 919 312 847 | paulo.quadros@fluidinova.com |
| 4 | Other members | | |
| | Dr. Hugo Ramos | | |
| 5 | Keywords | | |
| | Nanocrystalline hydroxyapatite manufacturer | | |
| 6 | Abstract of activities | | |
| | Fluidinova is a specialized manufacturer of synthetic nanocrystalline hydroxyapatite material, which is commercialized under the brand name nanoXIM®. Using an innovative proprietary technology – NETmix® – Fluidinova produces a highly pure, single phase nanoHydroxyapatite. nanoXIM® is supplied worldwide in different forms to manufacture Medical Devices, for Personal Care Product formulations, R&D activities and many other applications | | |
| 7 | Involvement in NEWGEN | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | INEB Instituto de Engenharia Biomedica<br>Universidade do Porto | | www.ineb.up.pt |
| **2** | **Address** | | **Country** |
| | Rua Campo Alegre 823, 4150 Porto | | Portugal |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Prof. Fernando Jorge Monteiro | +351-226074982 | fjmont@fe.up.pt |
| **4** | **Other members** | | |
| | Dr. Maria Pia Ferraz, Dr. Susana Sousa, Dr. Christiane Salgado, Dr. Marta Laranjeira, Prof. Maria Helena Fernandes | | |
| **5** | **Keywords** | | |
| | Nanophased composite, Drug releasing, composite scaffolds, in vitro and in vivo characterisation | | |
| **6** | **Abstract of activities** | | |
| | Phosphates and silicophosphates for bone regeneration.<br>We gained a lot of experience and expertise over the years in Phosphate materials, mainly at the nanoscale, in their application to 3D scaffolds based on several techniques, such as polymer sponge burn out, or associated to a natural polymer by cryogelation methods. We have experience in characterizing these materials with SEM/EDS, XPS, Atomic force microscopy, FTIR, characterize nanocrystalites size, and study scaffolds porosimetry to characterize the interconnectivity, pore size distribution and number of pores and actual surface area.<br>We have particularly expertise in microbiological studies on these materials, using bacterial strains like Staphylococcus Aureus, streptococcus epidermidis, Candida albicans, etc.<br>We have considerable expertise, for many years in in vitro cell cultures (particularly with osteoblasts, fibroblasts, Human mesenchymal stem cells, endothelial progenitor cells and osteoclasts, either as cell lines and primary cultures, including co-cultures) and full charaterization of cells biocompatibility, bioactivity, cell adhesion and proliferation, imuno-histochemistry, confocal microscopy, SPS page, Western blot, RT PCR, ELISA and all other major techniques used to characterize cells and tissues on the surface of these materials. We would like to move more towards in vivo model and to bioimaging studies | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee + Prof. Maria H. Fernandes : Management Committee Substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Medbone Medical Devices | | www.medbone.eu |
| 2 | Address | | Country |
| | Rua Fonte da Carreira nº350, B-17, 2645-467 - Cascais | | Portugal |
| 3 | Contact Person | Telephone | E-mail |
| | Claudia Ranito | +351 210 938 956 | claudia.ranito@medbone.eu |
| 4 | Other members | | |
| | | | |
| 5 | Keywords | | |
| | Medical devices for orthopaedic and dentistry implant surgery, calcium phosphate ceramics | | |
| 6 | Abstract of activities | | |
| | The Medbone® - Medical Devices Ltd is developing medical devices since 2008 for orthopedic and dentistry implant surgeries, using innovative technology, for the national and international market. Medbone´s mission consists in producing innovative high quality implants by providing the Medical Professional with additional tools to improve the living conditions of their patients. The products developed are absorbable biomaterials based on calcium phosphates, including hydroxyapatite (HAp) and tricalcium phosphate (TCP). These products are available in the form of granules, cylinders, wedges and in injectable form. The products produced have properties similar to natural bone, allowing a better quality of life for people.<br>The Medbone is constantly expanding the range of applications, responding to the growing needs of health professionals through the development of new medical devices, focusing on constant innovation, with the help of its R & D department, with protected industrial property.<br>The Medbone is a company certified by ISO 9001 and ISO 13485. | | |
| 7 | Involvement in NEWGEN | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Instituto Superior Técnico – Universidade de Lisboa (ICEMS) | | icems.ist.utl.pt |
| **2** | **Address** | | **Country** |
| | Avenida Rovisco Pais 1049-001 Lisboa | | Portugal |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | Catarina Santos | | |
| **5** | **Keywords** | | |
| | Metallic implants; bio-functionalization; bio-coatings; | | |
| **6** | **Abstract of activities** | | |
| | **WG3 : Functionalization of implants for improved functional and therapeutic effects**<br>Nowadays, metallic implants with multifunctional surfaces is an acknowledged need. One class of materials attracting a lot of attention are biodegradable metallic implants since its application avoids a second surgery, reducing costs and patients pain. The success and timely implementation of these biomaterials passes through the development and optimization of different nano architected interfacial layers, which typically are responsible for the biological interface and cell interaction. Several interesting interfacial layers can be developed such as: biocompatible sol-gel coatings, degradable polymers, calcium phosphate nanostructures, biocomposite coatings. Its use on metallic implants is still incipient but so far, it is recognized their degradation retardant effect, the improvement of the mechanical properties, and its capability to attract and fix biomolecules and/or ions that can stimulate bone tissue formation. On the other hand, advanced studies concerned with functionalization of non-biodegradable implants is also of utmost importance to ensure biocompatibility, reliability and performance. | | |
| **7** | **Involvement in NEWGEN** | | |
| | The Portuguese team combines expertise in materials science, chemistry, synthesis of nanoparticles and nanocomposite and functionalization of metallic surfaces with organic and inorganic coatings. Additionally the team has a vast knowledge in detection and characterization of nanomaterials in complex matrices or individually using a wide array of characterisation technqiues. Furthermore the team participates in the project ERA-MNT/0002/2009: BioMg, “A new generation of biodegradable implants obtained from magnesium alloys functionalized by means of advanced surface treatments”; this project addresses the surface functionalization of Mg alloys and their degradation in simulated body fluid electrolytes. For all the mentioned expertise and considering the aim of the NEWGEN, COST action the team has the necessary skills to successfully develop new strategies for bio-functional surfaces. The contribution includes:<br>-Development of temporary Mg-hydroxyapatite nanocomposites, using commercial NPs and synthesized NPs.<br>- Development of new biodegradable coatings for functionalization of metallic substrates (bio-resorsable Mg alloys and permanent metallic implants)<br>- Fabrication of functional nanostructures aimed to increased biocompatibility<br>-Quantitative and qualitative evaluation of the degradation products released from bio-reabsorbable Mg scaffolds.<br>-Physic-chemical characterization of the materials and of the degradation products as well as the materials that remains non-degradable or just partially degraded. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Dental Composite Materials "Raluca Ripan" Institute of Research in Chemistry - Babes-Bolyai University | | http://institute.ubbcluj.ro/iccrr/ |
| **2** | **Address** | | **Country** |
| | 30 FANTANELE Street - 400294 CLUJ-NAPOCA | | Romania |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | Dr. Gabriel Furtos | +40-364-405972 | gfurtos@yahoo.co.uk |
| **4** | **Other members** | | |
| | Dr. Cristina Prejmerean (cristina_prejmerean@yahoo.com) | | |
| **5** | **Keywords** | | |
| | Nanomaterials, dental composites, scaffolds and biomaterials, bone cement, dental polymers, sealant materials, fluoride release, degradation | | |
| **6** | **Abstract of activities** | | |
| | The Dept. of Dental Composite Materials from Raluca Ripan" Institute of Research in Chemistry- Babes-Bolyai University, Cluj Napoca, Romania is a leading multidisciplinary research group involved in the research in biomaterials and dental materials field.The laboratories of the department and equipment available are: electron microscopy, light microscopy, mechanical characterization, spectrometers, lab for biomaterials synthesis and preparation. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Dr. Cristina Prejmerean : Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Faculty of Dental Medicine<br>University of Medicine and Pharmacy Victor Babes | | http://www.umft.eu |
| **2** | **Address** | | **Country** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Materials, physics and nanosciences, dental materials, dental technology | | |
| **6** | **Abstract of activities** | | |
| | The University of Medicine and Pharmacy of Timisoara has been carrying on a many-sided and highly-qualified educational, research and medical assistance activity, for more than five decades.<br>Consequently, the achievements of this half-century are a proof of the joint effort of the academic staff, the students and of the technical and administrative body.<br>The University of Medicine and Pharmacy of Timisoara was set up in 1945, a year of milestones for the political, economical and social Romanian life, when communist regime took control of our country.<br>The University of Medicine and Pharmacy stands as a prestigious institution of higher education, with an honourable history path, and numerous achievements, rising above the difficult socio-political conditions. In so doing, it is almost certain that The University of Medicine and Pharmacy of Timisoara has a bright future ahead, hoping to get better results in training the undergraduates, on the way of becoming physicians, pharmacists and dental technicians, as well as in ensuring the proper medical assistance for the population.<br>The department of prothodonics focuses on interdisciplinary research in the field of dental materials, biomaterials and clinical studies to indentify how these materials interact with the natural body environment. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Babes-Bolyai University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering, Physical Chemistry Centre | | http://www.ubbcluj.ro/en/ http://chem.ubbcluj.ro |
| **2** | **Address** | | **Country** |
| | Physical Chemistry Centre, 11 Arany J. Str., 400028 Cluj-Napoca, Romania | | Romania |
| **3** | **Contact Person** | **Telephone** | **E-mail** |
| | **Univ. Prof. Maria Tomoaia-Cotisel, Director of Physical Chemisrtry Center** | +40 264 593 833 | mcotisel.chem.ubbcluj.ro@gmail.com mcotise@gmail.com |
| **4** | **Other members** | | |
| | Univ. Prof. Gheorghe Tomoaia, Assoc. Prof. Dr. Aurora Mocanu, Univ. Prof. Dr. Ossi Horovitz, Dr. Ioan Botiz, Dr. Roxana Diana Pasca, Drd. Corina Garbo, Drd. Ancuta Danistean, Drd. Alexandra Avram, Drd. Andreea Nita, Dr. Reeka Balint ; Drd. Levente Racz. | | |
| **5** | **Keywords** | | |
| | Bionanomaterials; Multi-substituted Hydroxyapatites ; Langmuir Blodgett collagen self-assemblies ; scaffolds for osteoblast cultures ; bone substitutes ; bone implants | | |
| **6** | **Abstract of activities** | | |
| | **Brief Curriculum Vitae**<br>Maria Tomoaia-Cotisel, Female, Physical Chemist. Graduated from Physical Chemistry Department, Babes-Bolyai University (BBU) in 1971. She is working in the same BBU University from 1971. She also worked at the King's College, University of London, U.K. (1981, 1986, 1989), the Philipps University of Marburg, Germany (1989/1990), the State University of New York at Buffalo, NY, USA (1990/1991), the National Institutes of Health, (1991-1993) and Molecular/Structural Biotech., Inc., (1994-1997), Bethesda, MD, USA. She was the director of UBB Research Laboratory in Thermodynamics, Chemical Structure, Biophysics, Colloid and Surface Chemistry (2000-2003) and NanoBioScience and Technology (2004-2006). Since 2007, she became the director of the Physical Chemistry Center, at BBU. She published over 220 original research papers, 4 US patents, and 10 books in physical chemistry, including thermodynamics, symmetry and group theory, biophysics, colloids and interfaces. She got awards, e.g., Gheorghe Spacu Award (1983, from the Academy of Sciences in Romania), Alexander von Humboldt Award (1986, Germany), Japan Society for Promotion of Science and Technology (1986) and Fogarty Award (1991, USA) for science and technology. Recently, she is focusing on advanced biomaterials, new composites and innovative nano powders, as well as on gold and silver nanoparticles, all materials with medical applications particularly in orthopedics, dentistry and oncology, including bone substitutes, porous scaffolds and novel implants, as well as on the drug development for osteoporotic bone and cancer treatment. For more details please visit our web:<br>**http://www.chem.ubbcluj.ro/romana/ANEX/cf/pcas/index.htm**<br>**and our profile on Google Scholar:**<br>**https://scholar.google.ro/citations?hl=en&user=bF6TKOsAAAAJ** | | |
| **7** | **Involvement in NEWGEN** | | |
| | We want to be involved in The **Action NEWGEN, in all the 4** Working Groups | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Faculty of Technology and Metallurgy, University of Belgrade | | www.tmf.bg.ac.rs |
| **2** | **Address** | | **Country** |
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| **4** | **Other members** | | |
| | Jasmina Stojkovska, Jovana Zvicer, Mina Jovanovic, Djordje Veljovic, Andrea Osmokrovic | | |
| **5** | **Keywords** | | |
| | skeletal tissue engineering, bioreactors, nanocomposite biomaterials | | |
| **6** | **Abstract of activities** | | |
| | The main research focus is in development and utilization of biomimetic bioreactors aimed for skeletal tissue engineering as well as for evaluation of novel biomaterials under physiologically relevant *in vitro* conditions. In specific, perfusion bioreactors are utilized to mimic hydrodynamic shears particularly relevant for bone tissue engineering while a custom-made bioreactor with dynamic compression is used to impose dynamic compressive loads relevant for cartilaginous tissues. Furthermore, a novel bioreactor with application of hydrostatic pressures is currently being developed. In parallel, novel hydrogel based nanomaterials are developed and characterized regarding stability and functionality under biomimetic bioreactor conditions. Specifically, alginate hydrogels with incorporated silver nanoparticles are developed in different forms such as microbeads, microfibers and sheets, and comprehensively characterized regarding silver release kinetics, biomechanical properties, cytotoxicity and antibacterial activity. Such hydrogels are attractive as potential antimicrobial wound dressings and soft tissue implants. Additionally, gellan gum scaffolds with bioactive-glass nanoparticles developed in the group of Dr Sasa Novak at Jozef Stefan Institute, Slovenia, are being investigated regarding hydroxyapatite (HAp) formation under different hydrodynamic conditions. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Our group will contribute expertise in design and operation of biomimetic bioreactors attractive for bone and osteochondral tissue engineering complementary with activities in the WG4. In specific, we will characterize polymer scaffolds based on gellan gum and alginate containing nano-particulate bioactive glass at concentration gradients developed in the research group of Dr Sasa Novak. The scaffolds will be assessed regarding HAp formation in simulated body fluid under two different bioreactor conditions relevant for bone: continuous fluid flow (the superficial velocity of ~240 μm/s) and dynamic compression (337.5 μm/s loading rate, 5 % strain, 0.68 Hz loading frequency, 1 h on/ 1 h off) coupled with scaffold perfusion (the superficial velocity of ~240 μm/s). Based on the obtained results, HAp formation and distribution within scaffolds will be correlated to the applied physical stimuli in order to optimize the scaffold structure and composition and predict performance upon potential implantation. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Materials and Environmental Chemistry<br>Arrhenius Laboratory<br>Stockholm University | | http://www.mmk.su.se/ |
| **2** | **Address** | | **Country** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Bioactive ceramics, bone growth mechanisms | | |
| **6** | **Abstract of activities** | | |
| | Understanding the bone growth mechanisms down to molecular, cellular and genetic levels; Developing bioactive ceramics for bone implants and morphogenetically active scaffolds, and pursuing their applications particularly in dentistry.<br>Close collaboration with the Company Nobel Biocare which is a major player in dental market; honored as Nobel Biocare Chair of Materials Innovation during the period of 2007-2011. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Swerea IVF AB | | www.swerea.se |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Shaping of ceramics, coatings, bioactive composites | | |
| **6** | **Abstract of activities** | | |
| | Swerea IVF offers advanced R&D and consulting services to the manufacturing and engineering industry. Our goal is the rapid introduction of new technologies and methods to practical use in our customers' operations. Our customers include industrial companies, as well as public institutions, that turn to us to develop their future resource efficient products and processes.<br>Swerea IVF is part of the Swerea Group, a Swedish industrial research group that encompasses Sweden's industrial research institutes within the fields of materials, process, product and production technology. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dept. of Periodontology, Faculty of Odontology, Malmö University | | www.mah.se<br><br>http://www.mah.se/english/Schools-and-faculties/Faculty-of-Odontology/ |
| **2** | **Address** | | **Country** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | preclinical, clinical, regeneration, bone substitutes, implants | | |
| **6** | **Abstract of activities** | | |
| | Preclinical and clinical evaluation of bone substitutes and oral implants. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG4 | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Engineering Ceramics Department - Jozef Stefan Institute | | www.ijs.si |
| **2** | **Address** | | **Country** |
| | Jamova 39 - 1000 Ljubljana | | Slovenia |
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| **4** | **Other members** | | |
| | Dr. Andraz Kocjan, Dr. Kristoffer Krnel, Mr. Martin Štefanič | | |
| **5** | **Keywords** | | |
| | Structural ceramics, zirconia for dental applications, ageing and fatigue behaviour, bioactivity improvement, calcium phosphate coatings, ceramic composites, FGM | | |
| **6** | **Abstract of activities** | | |
| | Engineering Ceramics Department at the Jozef Stefan Institute is the leading group in the field of structural (including bio-) ceramics and ceramic technologies in Slovenia. The research programme comprises phenomena relevant to the materials synthesis and component fabrication as well as mechanisms leading to degradation of engineering ceramic structures under operating conditions. The applied research work is focused on new applications of engineering ceramics, development of novel, high strength, wear-, corrosion- and/or heat-resistant materials and development of alternative, cost effective and environmental friendly ceramic technologies. The group is also strongly involved in the research, development and testing of biomaterials, especially bio-ceramics. We have a thorough expertise in the field of zirconia ceramics for dental and other bio-medical applications. The research involves materials' design, ceramic processing and fabrication of prototypes, as well as characterization of their physical and chemical properties. We are particularly interested in ageing and fatigue behaviour of ceramic materials, mainly for dental applications (Tomaz Kosmac). We are also involved in synthesis of various coatings aimed at modification of surface properties for particular bio-medical application, such as enhanced bonding of dental cements to chemically inert ceramic materials (Kosmac. Kocjan), and improved bio-activity of various materials (ceramics, titanium and its alloys and bio-polymers) by tailor-made calcium phosphate coatings produces using a biomimetic method(Kristoffer Krnel and Martin Stefanic). We also have extensive knowledge in the processing and synthesis of various ceramic composites including porous or functionally graded materials for bio-medical applications. (Kristoffer Krnel and Tomaz Kosmac). Our laboratory is very well equipped for the synthesis, thermal processing (high-temperature furnaces, SPS furnace) and analysis of materials (SEM, TEM, AFM, rheology, particle size analysis, specific surface and porosity, CT, mechanical properties, thermal properties etc.) | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dept Nanostructured Materials - Jožef Stefan Institute | | www.ijs.si; nano.ijs.si |
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| **4** | **Other members** | | |
| | Dr. Nataša Drnovšek, dr. Martina Lorenzetti, Ana Gantar (PhD student), Rok Kocen (PhD student) | | |
| **5** | **Keywords** | | |
| | Scaffolds for tissue regeneration; permanent bone implants<br>bioactive glass ; silk fibroin ; gellan gum ; bioactive composites with bioactive glass ; titanium ; titania coating for Ti ; antibacterial coatings | | |
| **6** | **Abstract of activities** | | |
| | The research group for Colloidal processing of materials is involved in research and development of nanocomposite scaffolds for tissue engineering as well as biomaterials for permanent (metallic) bone implants.<br>Within the first group of materials we are dealing with synthesis and characterisation of porous bioactive glass reinforced gellan gum or silk-fibroin. Rheological properties, mechanical strength, in-vitro bioactivity and cell responses are analysed. Moreover, the degradation rate and ion-release is monitored.<br>Metallic (titanium-based) implants are hydrothermally treated to produce firmly attached bioactive and photocatalytic anatase coating with the ability to repel bacterial attachment.<br>Selected publications:<br>- N. DRNOVŠEK, S. NOVAK, et al, Bioactive glass enhances bone ingrowth into the porous titanium coating on orthopaedic implants. International orthopaedics, 2012, 1739-1745<br>A. GANTAR, S. NOVAK, R. REIS, et al, Nanoparticulate bioactive-glass-reinforced gellan-gum hydrogels for bone-tissue engineering. Materials science & engineering. C, Biomimetic materials, sensors and systems, 2014, 27-36<br>- M. LORENZETTI, S. NOVAK, et al, The influence of surface modification on bacterial adhesion to titanium-based substrates. ACS applied materials & interfaces, 2015, 1644-1651 | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG1, WG2 | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Institute of Inorganic Chemistry of the Slovak Academy of Sciences | | http://www.uach.sav.sk/ |
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| | Assoc. Prof. Miroslav Hnatko, PhD. | | |
| **5** | **Keywords** | | |
| | bone substitute, silicon nitride, hydroxyapatite, cytotoxicity, bioactivity | | |
| **6** | **Abstract of activities** | | |
| | The main aim of the project is the preparation of the silicon nitride based composite with defined porosity modified by the surface layer of hydroxyapatite which is suitable for bio-applications. The optimisation of the preparation will be focused mainly on the mechanical properties which should be similar to human trabecular bone and on enhancement the bioactivity by application of the bioactive surface layer. The material should fulfill following requirements: defined porosity close to 50%, average pore size from 80 µm do 120 µm and strength about 100 MPa. Partial aims could be divided into three steps:<br>1. Optimisation of the preparation of porous Si3N4 ceramics and hydroxyapatite, the characterisation of prepared material in term of mechanical properties, chemical and phase composition.<br>2. Optimization of the hydroxyapatite surface layer coated on porous $Si_3N_4$ ceramics, calcinations regime and achievement of sufficient adhesion strength of the layer.<br>3. Characterisation of prepared composites from point of view of their behaviour in biological environment, determination of bioactivity and biocompatibility. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| 4 | Other members | | |
| | Dr. Ayse Begum Tekinay | | |
| 5 | Keywords | | |
| | Biomaterials, Peptides, Surface Biofunctionalization | | |
| 6 | Abstract of activities | | |
| | Our research involves developing new materials at the interface of chemistry, biology and materials science. Our research related to biofunctionalization of metal implant surfaces for enhanced osseointegration fits into NEWGEN activities. | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee Member<br>Working Group Member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Hacettepe University, Institute of Science | | http://www.bioeng.hacettepe.edu.tr/ |
| **2** | **Address** | | **Country** |
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| | | | |
| **5** | **Keywords** | | |
| | Bioengineering, medical devices | | |
| **6** | **Abstract of activities** | | |
| | | | |
| **7** | | | |
| | Management Committee Substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Advanced Materials Research Group<br>Department of Mechanical, Materials and Manufacturing Engineering<br>University of Nottingham | | www.nottingham.ac.uk/ |
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| | | | |
| **5** | **Keywords** | | |
| | Biomaterials, Coatings, Cell Surface Interactions | | |
| **6** | **Abstract of activities** | | |
| | The Department of Mechanical, Materials and Manufacturing is one of the leading departments of its kind in the world and is ranked fourth in the UK in the latest Research Assessment Exercise (RAE) results for the quality of its research. Its exceptionally close involvement with industry ensures its teaching and research has both relevance and meaning.<br>The Advanced Materials Research Group enjoys an international reputation for research excellence at the forefront of materials processing and characterisation, spanning: biomaterials, surface engineering, hydrogen storage materials, laser processing, novel photonics glasses and nano materials engineering. In the biomaterials area the research covers new materials, degradable composites, coatings with collaborations across campus and industry in the areas of tissue engineering and medical devices. The group is part of the UK centre for Innovative Manufacturing in Medical Devices.<br>The Group has extensive resources to support its work, and researchers have access to materials-orientated equipment and expertise across the University. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Biomaterials and Tissue Engineering Research Group<br>School of Dentistry<br>University of Leeds | | http://www.dentistry.leeds.ac.uk/staffpages/David%20Wood/default.aspx |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Repair, regeneration or replacement of skeletal tissues, biomaterial, dental materials | | |
| **6** | **Abstract of activities** | | |
| | Within the research theme, we aim to target the repair, regeneration or replacement of skeletal tissues; interests lie primarily, but not exclusively, in bone, cartilage, teeth and complex tissue. Research strands within the group encompass:<br>• Biomaterial development and characterisation; both traditional dental materials and also scaffolds/constructs for tissue engineering<br>• Interactions between biomaterials and cells in vitro and in vivo using a range of animal models<br>• Comparison of different stem cell populations and the way they respond to environment triggers such as cytokines and mechanical stimuli<br>• Molecular mechanisms of ageing<br>• Non-viral gene therapy for osteochondral tissue engineering<br>Responding to clinical need within our School, we are focussed on the maxillofacial and cranial regions of the skeleton, although the approaches we use are transferable to the broader orthopaedic environment. We are committed to ultimately seeing the translation of our research through to the clinic. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| 2 | Address | | Country |
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| 4 | Other members | | |
| | Maurice Abney-Hastings | | |
| 5 | Keywords | | |
| | Bone cement, granular material for otology | | |
| 6 | Abstract of activities | | |
| | Corinthian Surgical Ltd manufactures and markets a bone cement and granular material for otology.<br>From the Nottingham office they sell the products in Europe, U.S.A. Australia, and India<br>CS enjoys a wide variety of medical contacts throughout Europe and the U.S.A. and will certainly aid the consortium in bringing potential products to the pre-market stage. | | |
| 7 | Involvement in NEWGEN | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Dental Physical Sciences Unit<br>Institute of Dentistry - Queen Mary University of London | | www.qmul.ac.uk/ |
| 2 | Address | | Country |
| | Francis Bancroft Building QMUL Mile End Road London E1 4NS | | United Kingdom |
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| | Prof. Robert Hill | +44 207-882-5974 | R.Hill@qmul.ac.uk |
| 4 | Other members | | |
| | Dr. Natalia Karpukhina, Dr. Graham Roy Davis | | |
| 5 | Keywords | | |
| | Bioglasses, calcium phosphate cements | | |
| 6 | Abstract of activities | | |
| | Expertise on Bioactive Glasses including Strontium and Cobalt containing versions. Strontium stimulates osteoblasts and down regulates osteoblasts, whilst colbalt stimulates angiogenesis.<br>Filed key patents on bioactive glasses including porous scaffolds. Most recent patent is on calcium phosphate cements formed by mixing high phosphate bioactive glass powders with water that set to form cements based on brushite, octacalcium phosphate, hydroxyapatite or fluorapatite depending on glass composition. Professor Hill is inventor of Serenocem, a bone cement in clinical use developed with EU Brite EuRam funding. | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | The School of Engineering and Materials - Queen Mary University of London | | http://www.sems.qmul.ac.uk/ |
| 2 | Address | | Country |
| | Mile End Rd London E1 4NS | | United Kingdom |
| 3 | Contact Person | Telephone | E-mail |
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| 4 | Other members | | |
| | | | |
| 5 | Keywords | | |
| | CaP ceramic synthesis and processing, in vivo and in vitro testing | | |
| 6 | Abstract of activities | | |
| | Development and investigation of mechanisms behind the phenomena of osteoconduction and osteoinduction in synthetic bone graft substitutes, including optimisation of graft structure and chemistry. Expertise in CaP ceramic synthesis and processing, in vivo and in vitro testing. Founding scientist of ApaTech, responsible for the development of Actifuse and inductifuse bone graft substitutes – now both in global clinical use. Development of porcine based ligament and bone grafts with TSL/Covidien. | | |
| 7 | Involvement in NEWGEN | | |
| | Management Committee member substitute<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Department of Materials<br>Imperial College of London | | http://www3.imperial.ac.uk/materials |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Processing of bioceramics and bioactive glasses, Mechanical properties, Organic/inorganic interfaces-adhesion, mineralization | | |
| **6** | **Abstract of activities** | | |
| | Key biomaterials focussed activities in the Department include the development of new scaffolds for regenerative medicine, biomaterials characterisation, stem cell therapy, cell-materials interface engineering, self-assembled biomimetic copolymers and nanomaterials for biosensing applications. A large proportion of the work in the Department focuses on materials that can stimulate beneficial biological responses from the body, such as the stimulation of tissue repair.<br>Tissue engineering has the potential to achieve this by combining materials design and engineering with cell therapy. Biomaterials can provide physical supports for engineered tissues and powerful topographical and chemical cues to guide cells. Biomaterials engineering involves synthesis, processing, and characterisation of novel materials, including polymers, proteins, glasses, cements, composites and hybrids. Introducing nanoscale cues such as nanotopography or nanoparticles as therapeutic agents provide an exciting approach to modulate cell behaviour. In order to probe the cell-material interface, we are pioneering new analytical and non-invasive techniques such as high resolution electron microscopy and live cell bio-Raman micro-spectroscopy. We are developing new synthetic biocompatible polymeric materials with unprecedented function and probing their biological efficacy.<br>Another area in which our biomaterials activities are particularly exciting is the tailoring of inorganic nanoparticles such as gold and quantum dots with bioactive peptides so that they can act as reporters for the detection of enzyme activity. Ultrasensitive detection of enzymes related diseases such as cancer or infectious diseases is of huge global impact. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Management Committee member<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Bioceramic and biocomposite processing; additive manufacturing; musculoskeletal tissue engineering | | |
| **6** | **Abstract of activities** | | |
| | Newcastle University has major research activity relating to biocomposites, musculoskeletal tissue engineering and biofabrication.<br><br>The group undertakes materials and biofabrication research within the £5.5M Arthritis Research UK Tissue Engineering Centre, collaborating with other UK partners on the development of new devices and therapies for osteochondral repair.<br><br>The group co-ordinates the €4M FP7 RESTORATION project, which is developing new resorbable ceramic biocomposites for orthopaedic and maxillofacial applications.<br><br>The group is leading on the development of “near patient materials processing” as part of the £6M EPSRC Centre for Innovative Manufacture in Medical Devices, developing new techniques for minimally invasive implantation of bioactive materials and processes for in-clinic manufacture. | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| **2** | **Address** | | **Country** |
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| **3** | **Contact Person** | **Telephone** | **E-mail** |
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| **4** | **Other members** | | |
| | | | |
| **5** | **Keywords** | | |
| | Biomaterials, Biopolymers, Electrospinning, Bioceramics, multifunctional coatings, antimicrobial peptides, peptide drug delivery, antimicrobial surfaces, antibacterial materials, synthesis, characterisation | | |
| **6** | **Abstract of activities** | | |
| | The Biomaterials Group in the School of Metallurgy and Materials led by Dr A. Stamboulis, has currently 6 PhD students dedicated in the development of multifunctional biomaterials for orthopaedic and opthalmological applications. With 2 patents on antimicrobial surfaces and drug delivery based on small peptides that were published in 2014, the group is developing a number of technologies that can be used in multi-functional coatings for the treatment of infections (e.g. polymeric antimicrobial coatings as well as functionalised hydroxyapatite and biomimetic hydroxyapatite coatings) as well as glaucoma treatment via the successful delivery of an anti-scaring agent in the cornea of the eye. In addition, the group has been also working on the structural characterisation of bioceramics (substituted hydroxyapatites), biomedical glasses (effect of network modifiers on the crystallisation and amorphous structure of glasses) and polymers (electrospinning of 3D scaffolds with different functionalities) aiming to contribute towards more fundamental research and better understanding of the relationship properties–biological behaviour.The group has close contact with the calcium phosphate group in INP Toulouse in France, the University of Trieste in Italy, University of Technology in Sydney, a number of Universities in India and also other collaborations within UK (Queen Mary University of London, University of Wolverhampton and University of Warwick). | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG1 : Design and Synthesis of New Materials<br>WG3 : Functionalisation of implants for improved functional and therapeutic effects | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Glass Technology Services | | http://www.glass-ts.com |
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| **4** | **Other members** | | |
| | Nick Kirk, Robert Ireson, Chris Holcroft, David Eustice, Martyn Marshall | | |
| **5** | **Keywords** | | |
| | Bioactive Glasses, 3D printing, coating | | |
| **6** | **Abstract of activities** | | |
| | Glass Technology Services Ltd (GTS) is a wholly owned subsidiary of the British Glass Manufacturers Confederation (BG) which provides a wide range of services to the glass industry and companies in the 'glass' supply chain. These services include technical support, consultancy, contract R&D and analytical services. In addition GTS also conducts a range of internal R&D activities alone or in partnership with other organisations. The research carried out covers a wide range of glass related topics generally focused upon bringing novel glass technology into wider use.<br>GTS has the capability to design glasses with bespoke properties (eg. durability, density, $T_g$, transmission properties) as well as manufacture novel glass up to 10 Kg – scale.<br>GTS is leading and participating in several collaborative research initiatives involving glass across the UK and internationally, both within the conventional glass industry sectors (flat products, containers, fibre glass) and more novel uses of glass (e.g. photonics, bioactive glasses, additive manufacturing – www.glass-ts.com/projects ).<br>Over the last 3 years, GTS has been involved in several major research projects in the field of Biomaterials, including: MaTCH (FP7: 286548), RESTORATION (FP7: 280575), SCAMP (Innovate UK: 101227), BioGlaM: (Innovate UK: 101480), FASTIC: (Innovate UK: 101670), LUSTRE (FP7:324538). | | |
| **7** | **Involvement in NEWGEN** | | |
| | Working Group Member | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | Queen's University | | www.qub.ac.uk |
| **2** | **Address** | | **Country** |
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| **4** | **Other members** | | |
| | Alex Lennon, Dan Sun, Eoin Cunningham, Chi Chan, Andrew Hamilton | | |
| **5** | **Keywords** | | |
| | FDM, PLLA, PLGA, Calcium phosphate, bioresorbable | | |
| **6** | **Abstract of activities** | | |
| | Involves medical devices used in bone repair applications, utilising bioresorbable polymers, natural materials and calcium phosphates. The research into bioresorbable polymers focuses on synthetic biocompatible polymers such as polylactic acid (PLA) and polyglycolic acid (PGA) and techniques to monitor and control their bioresorption profile.<br>Our Polymer Processing Research Centre (PPRC) has a wide range of facilities for both melt-processing and characterisation. | | |
| **7** | **Involvement in NEWGEN** | | |
| | WG2 : Manufacturing and characterization of 3D-porous scaffolds | | |

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|---|---|---|---|
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| | | | |
| **5** | **Keywords** | | |
| | Peptide-based hydrogels ; polymer brushes ; nanomaterials ; mechanotransduction. | | |
| **6** | **Abstract of activities** | | |
| | Our lab is focused on the design of biomaterials and biointerfaces for the study and control of cell phenotype. We design 2D nanointerfaces based on polymer brushes (study of chemistry and surface characterisation), with controlled nanoscale geometry and mechanics, to control cell adhesion, spreading and phenotype. Our work in 3D hydrogels focuses on the design of peptide-based hydrogels generated via thiol-ene coupling. We study their chemistry, mechanics and degradation, formation of composites and the phenotype of cells loaded in such matrices (matrix remodelling, cell protrusion, invasion, stem cell fate). | | |
| **7** | **Involvement in NEWGEN** | | |
| | Design of hydrogel composites for 3D printed scaffolds supporting bone regeneration. | | |

| 1 | Institution | | Website |
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| **5** | **Keywords** | | |
| | Orthopaedic bioengineering ; scaffold, bone, cartilage, osteoarthritis, biomaterials | | |
| **6** | **Abstract of activities** | | |
| | Dr Chaozong Liu is a senior lecturer at UCL Division of Surgery & Interventional Science, the Royal National Orthopaedic Hospital. His research is directed toward biomedical devices development for enhancing treatment of musculoskeletal disorders. Core activities include: (1) scaffold innovation for musculoskeletal tissue regeneration; (2) Customized medical devices for intervention of orthopaedic disorders. (3) Biomedical device surface processing for enhancing *in vivo* service functions. | | |
| **7** | **Involvement in NEWGEN** | | |
| | | | |

| 1 | Institution | | Website |
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| | | | |
| **5** | **Keywords** | | |
| | Bio-active glasses, bio-sensors | | |
| **6** | **Abstract of activities** | | |
| | Design and evaluation of bio-active glasses for hard and soft tissue applications and fabricating glasses for sensors, including bio-sensors | | |
| **7** | **Involvement in NEWGEN** | | |
| | MC Observer<br>Working Group member | | |

| 1 | Institution | | Website |
|---|---|---|---|
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| **5** | **Keywords** | | |
| | Tissue engineering, cell therapy, wound healing, surface modification, plasma processing, surface analysis, biodegradable porous materials, wound healing, in vitro and in vivo characterisation of materials, biosensors, drug delivery, theranostics, high throughput screening, antimicrobial surfaces | | |
| **6** | **Abstract of activities** | | |
| | In the Mawson Institute of the University of South Australia, we are pursuing a range of research activities on biomaterials and tissue engineering. One of the key activities focuses on biodegradable porous semiconductor materials (in particular porous silicon) that we use as scaffolds, drug delivery vehicles and for photonic biosensing. Other activities include biomaterial surface modification via plasma polymerisation with the resulting materials being used in cell therapy and as antimicrobial implants. We have key strengths in surface characterisation of biomaterials and also in the in vitro and in vivo testing of biomaterials. | | |
| **7** | **Involvement in NEWGEN** | | |
| | We have an interest in all four WGs of this Cost Action. | | |

| 1 | Institution | | Website |
|---|---|---|---|
| | University of Wollongong | | www.uow.edu.au |
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| | | | |
| **5** | **Keywords** | | |
| | Electroactive materials, piezoelectric polymers, electrospun fibre mats, polymer ceramic nano and micro composites | | |
| **6** | **Abstract of activities** | | |
| | + 61 2 4221 4614 | | |
| **7** | **Involvement in NEWGEN** | | |
| | Electroactive polymers such poly(vinylidene fluoride) and (vinylidene fluoride) copolymers has the highest piezoelectric constant among polymers and they are showing great potential for biomedical applications, especially as scaffolds, particles and fibres.<br>Biodegradable electrospun mats: bioresorbable polyesters such as polylactide and polyhydroxybutirate also present piezoelectric activity similar to the bone.<br>The effect of piezoelectric polymers filled with nano hydroxyapatite or even with Bonelike® particles shows great potential for bone applications.<br>Several processing techniques are available to produce scaffolds, polymer particles and polymer fibres with composite micro and nano particles to enhance bone regeneration.<br>A functional layer in form of particles, fibres are also a goal. | | |

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