COST Action
Final Assessment Review

MP1301: New Generation Biomimetic and Customized Implants for Bone Engineering

(02/10/2013 to 01/10/2017)

This report is submitted by the Action Rapporteur in fulfilment of the requirements of the rules for COST Action Management, Monitoring and Final Assessment and is confidential to the COST Association and the Management Committee of the Action.

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Summaries

Main aim/ objective

The main objective of the Action is to create collaboration in the field of biomaterials to realise new functionalized, bioresorbable and customized bone substitutes and more reliable implants.

The Action addressed this as described below.

The Action merged the fundamental knowledge of Academics, ability for transferring technologies of R&D centres, productivity of industrials and practice of clinicians. At the end (October 1st, 2017), the Action network has grown up to 33 European countries and around 160 partners with almost 50% of non academic institutions.
9 workshops and 2 training schools has been organised, involving contribution of each WG and STSM grantees to propose sessions with oral presentation and posters.
As other activities having met a considerable success, 46 STSMs has been approved, a majority for PhD students and ECI, resulting in fruitful collaboration, joint scientific publications, new projects and participation in scientific international conferences.
The fruitful collaboration between partners (including companies and surgeons!) finally resulted in important outputs with huge scientific impacts: creation of two start-up companies (SEQVERA and ASKEL HEALTHCARE), the commercialization of a new calcium phosphate cement (DirectInject TM), the edition of a book with more than 30 authors), more than 30 joints scientific publications and 6 funded-projects in the framework of FP7 or H2020 programmes.
These incredible success stories encouraged our members to find new ways to work together, and they already proposed to introduce new COST Actions, new European projects, and other networking activities (for instance : new working groups within the European Ceramic Society("Biocermics and Young Ceramists Network).

The Rapporteur summarised the Action’s major outcomes, impacts and successes as follows.

The COST Action MP1301 NEWGEN was successful. This Action has created a highly extensive network of academic, clinical and industrial partners and brought together different disciplines, all with the aim to make a scientific, technological and societal impact in the field of biomaterials for bone repair and regeneration. The objectives, which were clearly stated were reached, as was illustrated by the various deliverables of the project. Materials and knowledge were exchanged through numerous STSMs, and through various workshops and meetings. The Action partners, published (or submitted for publication) over 30 articles in relevant journals in the field, one book was edited by the partners, (invited) presentations were given at various conferences, an attractive website was created and kept up to date. Furthermore, 6 European projects were successfully applied for by the partners, 2 start-up companies were created and 1 product was introduced in the market by a larger industrial partner. There are also clear plans for continuation of collaboration beyond the Action, to further impact the field at different levels. Taken together, a functional collaborative network was established that has made an impact and will expectedly continue to do so in the future.

Achievement of MoU objectives, deliverables and additional outputs/ achievements

MoU objectives

The Action reported the achievement of the following objectives and their dependence on the Action networking.

MoU objective	Level of achievement reported by Action	Dependence reported by Action	Dependence assessed by Rapporteur
the improvement and dissemination of knowledge and expertise in the tailoring of the bioresorbability rate by an adjustment of new synthesized material compositions: Degradable implants	**76 - 100%**	**High**	**High**
the improvement and dissemination of knowledge and expertise in the processing of functionally graded biomaterials (bio-FGM) with close control of composition, of the external shape and of hierarchical interconnected porosity, in order to mimic the natural bone structure: Functional biomaterials for improved biocompatiblity	**76 - 100%**	**High**	**High**
the improvement and dissemination of knowledge and expertise in the implant functionalization which will promote bone growth by soliciting the osteogenic activity of osteoblasts by controlled diffusion of growth factors by the materials with added biocide molecules: Long-term stability, improved biocompatibility performances	**76 - 100%**	**High**	**High**
the improvement and dissemination of knowledge and expertise in the validation by in-vitro and in-vivo testing of the biocomposite materials. Development of in vitro assays as indicators of long-term in vivo performance, demonstration of improved therapeutic outcomes for surgery, comprehensive pre-clinical data	**76 - 100%**	**High**	**High**
the improvement and dissemination of knowledge and expertise in the scaling-up of the complete process to a medical environment through a medical certification at each step of the process (from feedstock preparation to final functionalized implant): Implant in optimal position for entering further clinical trials and integration of the whole manufacturing process within the industries and within a hospital environment.	**76 - 100%**	**High**	**High**
The progression of European industries into European and global biomaterials markets	**76 - 100%**	**High**	**High**
The dissemination and the transfer of the resulting collaborative work	**76 - 100%**	**High**	**High**
The promotion of innovative projects in the field of tissue engineering	**76 - 100%**	**High**	**High**
To develop education and training of young multidisciplinary researchers	**76 - 100%**	**High**	**High**

Dependence = dependence of the achievement (of each MoU objective) on the Action networking.

Rapporteur assessment of the achievement of MoU objectives that the Action reported as achieved (76-100%)

The Action **did** achieve all the above objectives that it reported were more than 75% achieved.

Action explanation regarding MoU objectives reported as not fully achieved (less than 76%)

The table below shows the Action's explanation and the Rapporteur's analysis thereof for any MoU objectives that the Action reported as not fully achieved.

MoU Objective that was reported as not fully achieved	Action's explanation	Rapporteur's analysis
The Action did not report any objectives as not fully achieved.		

General Assessment of MoU objectives

The level of ambition of the MoU objectives was **Medium**
Overall, **the Action Achieved all MoU objectives** .

Deliverables

Delivery and level of dependence of deliverables reported by Action

Deliverable	Timing deliverable	Dependence reported by Action*
Development of biomaterial feedstock with adapted bioresorption rates for absorption tests and for the study of their ability to be shaped by the innovative process like rapid manufacturing techniques	**Delivered**	**High**
Design of new implants, development of new multi-material process machine	**Delivered**	**High**
Proof of the bioactivity and of the improved biocompatibility of functionalized implant	**Delivered**	**High**
For each WG: A mid-year (progress) and an annual (scientific) reports, to be sent to the MC. The first reports will ideally contain a state-of –the-art of the main subjects of interest, as well as a global European roadmap for R&D, market, potential partners, etc.	**Not foreseen**	**Low**
For each WG: • Contribution to the Action website by editing a specific webpage • Scientific publications: to be submitted to the MC for approval. • Proposition of concrete projects (at least one) at the end of the Action, involving partners issued from the different WGs.	**Delivered**	**High**
For each WG: In collaboration with the MC: organisation of at least one dedicated event (Workshop, training school for early-stage researchers, scientific conferences). Short-term scientific missions will be organized through the duration of the Action	**Delivered**	**High**

** Dependence reported by Action = the extent to which the delivery of the deliverable was dependent on the Action networking*

Analysis of level of delivery of deliverables

The level of delivery of the deliverables reported above is assessed as follows. The Action has delivered the majority of the planned deliverables. The deliverables are directly related to the set objectives, confirming that indeed all of them have been appropriately addressed. Clearly, it is difficult to evaluate whether for example, one, three of five new raw materials would be a high achievement, but it is clear that the collaborative action, through materials and knowledge exchange (through STSMs, workshops and meetings) has led to the enhancement of knowledge of all partners and has also resulted in new ideas, scientific outputs and even products.

Analysis of deliverables reported by the Action as delivered

The deliverables that the Action reported as delivered are confirmed.

Analysis of deliverables reported by the Action as not delivered but delivery foreseen within 2 years

The Action did not report plans to deliver any deliverables in the future.

Analysis of deliverables reported by Action as not delivered and delivery not foreseen

Deliverable	Explanation
For each WG: A mid-year (progress) and an annual (scientific) reports, to be sent to the MC. The first reports will ideally contain a state-of –the-art of the main subjects of interest, as well as a global European roadmap for R&D, market, potential partners, etc.	Each WG Leader proposed an oral reporting at the end of every event the Action has organized during these 4 years. MC and CG meetings also involved a contribution of each WG Leaders, so we finally decided not to ask for supplementary reporting

The Action's explanation is analysed as follows The delivery phase was not foreseen for progress and annual scientific report by WGs to be sent to MC, and the dependence of achievement was reported as low. This is well justified, as this type of progress is also discussed during meetings, workshops etc. as well as in the progress and final report of the action, so these additional reports may be obsolete.

Analysis of the level of dependence on the Action networking of the achievement of the deliverables

The dependence on the Action networking of the achievement of the deliverables reported by the Action is confirmed

General Assessment of deliverables

The level of ambition of the deliverables was **medium**
Overall, **the Action delivered > 4 deliverables**

Additional outputs / achievements

Co-authored Action publications

The Action reported 34 publications on the topic of the Action, co-authored by at least two Action participants from two countries participating in the Action, and for which the Action networking was necessary. The full list of publications appears in Annex I.

Action networking was necessary for ALL of the listed publications

The:

- quality of the Action's co-authored publications is very good.
  The papers are published in relevant journals in the field. These are not necessarily the top journals, with highest impact factor, however, the majority of them is well respected by the field.

- significance of the Action's co-authored publications is good.
  The publications add to the existing knowledge in the field. They all report a relatively early state of biomaterials development, up to the in vitro studies. Nevertheless, they are significant.

- relevance to the Action of the Action's co-authored publications is very good.
  The relevance for the field is evident, in particular as scientific input for development of improved biomaterials for orthopedics and maxillofacial surgery.

- quantity of the Action's co-authored publications is good.
  Out of 34 reported publications, 25 are published/accepted for publications, while 9 are submitted. This is on average 9 publications per year, which is a good achievement, considering that it takes a while before collaboration has really started and the results are generated.

Projects and proposals resulting from Action activities

The Action reported the following projects resulting from Action activities involving at least one Action participant, and for which the Action networking was necessary.

Title	Main proposer name	Funder
NEXT-3D - Next generation of 3D multifunctional materials and coatingss for biomedical applications	Prof. K. Dalgarno	H2020
FP7 "EuroNanoMed2" – NANOFOROSTEO (2014-2017) Multifunctional injectable nano HAp composites for the treatment of osteoporotic bone fractures	Mauro Alini	FP7
DOC-3D Ceram:	David Grossin	H2020
AMITIE - Additive Manufacturing Initiative for Transnational Innovation in Europe	Fabrice Rossignol	H2020
Baltic Biomaterials Centre of Excellence	Janis Locs	H2020
SISCERA - Smart Implant from Safe Ceramics	Nicolas Courtois	H2020

In addition the Action reported 0 proposals resulting from Action activities involving at least one Action participant, and for which the Action networking was necessary.

Relevance of the Action's proposals and/ or projects is **very good** Quantity of the Action's proposals and/ or projects is**excellent** Action networking was necessary for ALL of the listed proposals / projects

Other outputs / achievements

The table below shows the other outputs/ achievements and level of dependence on the Action networking reported by the Action and the Rapporteur's assessment thereof.

Other output/ achievement reported by Action	Dependence reported by Action	Dependence assessed by Rapporteur
Creation of a start-up company (ASKEL HEALTHCARE Ltd., FIN, www.askelhealthcare.com), 2017, for new biomaterial for articular cartilage repair - utilized networking with several partners in UK, IE, FI	**High**	**High**
Creation of a start-up company (SEQVERA Ltd, FIN, www.seqvera.com), 2016, for new method of biomaterials simulation and testing - utilized networking with several partners in LV, EE, IT, PT, FI	**High**	**High**
Edition of a book: "Advanced in Ceramic Biomaterials - Materials, Devices and Challenges", edited by Paola Palmero, Francis Cambier and Eamonn De Barra - Woodhead Publishing – ISBN 978-0-08-100881-2. (470 pages, more than 30 authors)	**High**	**High**
DirectInject,™: Product developed, regulatory approval and brought to market during the Action, implanted in >5000 people to date	**High**	**High**

The quality, quantity and dependence (on the Action networking) of the other outputs/ achievements was assessed as follows.
With 2 start-up companies, one product brought into a market by a larger company, an d an edited book, this is a very good output of the action, both in quantity and in quality.

Assessment of additional outputs and achievements (including co-authored publications and proposals/ projects)

The level of ambition of additional outputs and achievements was **high**. Overall, **the Action achieved 2-4 valid additional outputs / achievements** .

General Assessment

The Action's outputs and achievements are **very Good**.

Impacts

The Action reported the following impacts (the short- to long-term scientific, technological, and / or socioeconomic changes produced by a COST Action, directly or indirectly, intended or unintended) that have resulted, or might result, from the Action.

Description of the impact	Type of impact	Timing of impact
• Publications in peer-reviewed journals: more than 30 are already accepted and published, but it is expected that this number will increase during the next two years with joint papers based on results issuing from collaborative works between partners from NEWGEN. Even if the number of publications within NEWGEN is not as impressive as other COST Actions, it must be kept in mind that the domain of biomaterials and implants for bone tissue engineering is an interdisciplinary field, and biological assays and testing are time consuming.	• Scientific / Technological	Achieved
Validity, relevance and significance (in particular importance and timeliness) of the impact reported by the Action: This is a relevant and good achievement. All publications are collaborative, and add to the existing knowledge. The number is reasonable too, and it can be expected that the number will grow beyond the project as new partnerships have been formed. Publications will certainly have a scientific and technological impact on the field.		
• NEWGEN and EU Framework projects: 6 H2020 funded projects are listed in the outputs part of this final report. Even if it is more than foreseen in our goals (up to 3 initially in the MoU), these 6 funded projects are only a very small percentage of the non-funded proposals in this H2020 framework and of the other projects funded from other European or National programmes (ERA.net, for instance). This is only to point out the intensive collaboration between NEWGEN partners that emerged from the opportunities given to them by the events and meetings organized through the Action.	• Scientific / Technological	Achieved
Validity, relevance and significance (in particular importance and timeliness) of the impact reported by the Action: An impressive achievement, especially considering a relatively low success rate for funding projects in this field. The scientific and technological impact are evident, also on longer term.		
• Intersectorial-, interdisciplinar-, cross-aged- impact of the Action: the main aim of the Action was to create bridges and to foster interactions between companies and their production experiences, academics and their scientific knowledges, R&D centers and their transferability and scaling-up skills, and finally surgeons and medical groups as end-users. In this way, NEWGEN has a positive impact on reducing the existing gap by facilitating a large network of partners (more than 160!) with "only" around 50% of academics. More than only their systematic participation to our workshops and meetings, but integration of industrial partners (even as coordinator of project, like in "SISCERA" with Anthogyr as Leader), medical groups and R&D in funded European projects is a proof of the achievement of the goal of our Action. Moreover, the created network has encouraged the synergies between people coming from completely different horizons (biologists,	• Scientific / Technological	Achieved

chemists, physicians, materials scientists, clinical surgeons, etc.) that, maybe, would not have imagined to meet each other in another context. NEWGEN was also one of the best opportunities for young researchers to meet more experienced scientists. PhD students and ECI actively participated to workshops, STSMs and Training Schools, and the feedbacks (from the two sides) were really positive.		
Validity, relevance and significance (in particular importance and timeliness) of the impact reported by the Action: A good involvement of industrial partners, not only on the paper, but also with active roles in the project, STSMs and workshops/symposia. This is indeed a multidisciplinary field, and the action was highly successful in not only bringing different stakeholders together, but also in connecting different disciplines.		
• DirectInject,™: Product developed, regulatory approval and brought to market during the Action, implanted in >5000 people to date. Employment new R&D and manufacturing staff in Univ. Limerick L and Stryker Orthopaedics. Further funded collaboration and research in the theme of the Action has resulted from this development. Multi award winning project: 2015 Winner Academic Contribution to MedTech – Irish Medical Technology Awards hosted by IDA/EI/IMDA (http://www.ul.ie/news-centre/news/ul-wins-academic-contribution-to-medtech-award#When:14:46:14Z); 2016 UL Research Impact Award Winner; 2016 Stryker Global Annual Awards Best invention; 2017 Winner Irish HEI with US Corporate Links - US-Ireland Innovation Awards Hosted by American Chamber of Commerce, Ireland and The Royal Irish Academy(https://www.irishtimes.com/news/ireland/irish-news/bone-cement-technology-wins-innovation-award-1.3089788)	• Scientific / Technological • Economic • Societal	Achieved
Validity, relevance and significance (in particular importance and timeliness) of the impact reported by the Action: A successful development and clinical application of a product, which is now widely used. Such a development, based on a collaboration between academics, industry and clinicians clearly shows the potential of the field of biomaterials to have a direct societal and economic impact, in addition to puur scientific/technological impact.		
• As planned in the MoU of the Action, NEWGEN created the seed of a large collaborative network on biomaterials in Europe. Without COST funding, it would have not been possible to have existed. But now that the Action is ended, new networking arises, which makes it possible to perpetuate the collaboration: the European Ceramic Society (ECERS) initiated two new working groups, the first one “Bioceramics” will be dedicated to ceramics with biomedical applications, and the second one “The Young Ceramists Network – YCN” groups PhD students and ECI affiliated to ECERS, aiming at bringing young students and professionals currently doing research on Ceramics. COST proposal “BEST CARE” (Reference OC-2017-1-22309) is also an initiative of several NEWGEN partners, wishing to continue and strengthen their scientific relations in the domain of “Biomaterials Enhanced Scientific Transition for Computer-Aided Recovery Engineering”.	• Scientific / Technological	Foreseen within 2 years
Validity, relevance and significance (in particular importance and timeliness) of the impact reported by the Action: The partners of the action are actively involved in new initiatives (via ECRS and other COST actions) to impact the field scientifically, technologically, and societally beyond the action.		

The extent to which the Action has advanced the careers, skills and networks of researchers including ECIs (as described by the Action) is very good.

General assessment of impacts

The Action’s impacts are best described as follows.
Multiple highly significant impacts are reasonably foreseen, at least one of which is already observed [Excellent]

Dissemination and exploitation of Action results (other than co-authored Action publications listed previously)

Dissemination meetings funded by the Action

The following Dissemination meeting(s) funded by the Action added value for the Action:

- REDEOR, 01-01-1970 - 01-01-1970, 25
- 14th ECERS Conference, 01-01-1970 - 01-01-1970, 15
- Innovation in Biomedical Materials, 01-01-1970 - 01-01-1970, 51

Action website

http://www.cost-newgen.org

The:

- openness and user-friendliness of the Action website are excellent
- content of the Action website (programmes and minutes of all events present, all outputs/ deliverables accessible from website) is fair

The Action website was an effective means of disseminating the Action.

Other dissemination activities

The following other dissemination activities reported by the Action were effective and added value

Item/activity	REDEOR Int. Conf. – Venice (IT), 25-27 March 2015
Target Audience	150 Scientists and clinicians working in the field of biomaterials. Final Event of COST Action NAMABIO (MP1005)
Outcome of the activity	Invited talk : “Technologies to process biomaterial scaffolds and customized implants for bone tissue engineering”, S. Hocquet (CRIBC, BE)
Hyperlink	http://alisf1.univpm.it/redeor/

Item/activity	European Ceramic Congress 2015, 21-25 June 2015 (Toledo, ES)
Target Audience	ECerS conference is organised every 2 years and more than 800 members are participating.
Outcome of the activity	- Oral talk: “Technologies to process biomaterial scaffolds and customized implants for bone tissue engineering”, D. Hautcoeur (CRIBC, BE) - Keynote : “Zirconia-based composites with tailored composition and architecture: elaboration and microstructural characterization”; P. Palmero (Polito, IT) - Oral talk: “Mechanical behaviour of zirconia-based ceramic composites with tailored composition and microstructure for biomedical applications”; H. Reveron (INSA-Lyon, FR) - Oral talk: “Novel Polymeric ceramic composites fabricated by freezingthawing method for bone generation”; M. Canillas (ICV, ES) - Keynote : “Bioactive and ferrimagnetic glass-ceramics doped with silver and copper”; E. Verne (POLITO, IT) - Oral talk: “Effects of hydrofluoric acid etching treatments on surface morphology, microstructure and adhesion properties of a lithium disilicate glass ceramic”; F. Prete (CECEBO, IT)
Hyperlink	http://media.wix.com/ugd/09d8d3_7adf8cfeedb94155918e567fc742b70c.pdf

Item/activity	40th International Conference & Exposition on Advanced Ceramics and Composites; 24-29 January 2016 (Florida, USA)
Target Audience	American Ceramics Society members
Outcome of the activity	Prof. A. Leriche was invited to this ACerS meeting, to present the work done in collaboration between LMCPA-FR, CRIBC-BE and INEB-PT, in the framework of symposium 5: “Next

	Generation Bioceramics and Biocomposites" - title : "Microwave sintering of hydroxyapatite ceramics for biological applications"
Hyperlink	http://ceramics.org/meetings/40th-international-conference-and-expo-on-advanced-ceramics-and-composites

Item/activity	11th Pacific Rim Conference of Ceramic Societies (PACRIM 11) 30/08/2015 – 04/09/2015 (Jeju, KOR)
Target Audience	International scientists in the field of ceramic materials
Outcome of the activity	Prof. A. Leriche was invited by the organisers of PACRIM to present the work done in collaboration between LMCPA-FR, CRIBC-BE and INEB-PT in the framework of symposium 6: “CERAMICS IN BIOLOGY, MEDICINE AND HUMAN HEALTH” - title : "Processing of Macro and Microporous Ceramics for Bone Subtitutes and Functional Composites Applications"
Hyperlink	www.pacrim11.org/

Item/activity	E-MRS, Lille, France, (May 2016).
Target Audience	The European Materials Research and Science conference is held twice a year and one symposium is dedicated to materials for healthcare.
Outcome of the activity	Oral talk: “Development of chemically cross-linked polymer/bioceramic hydrogel composites for bone regeneration applications.”; T. Geever (Athlone Institute of Technology, IE) It was an opportunity for NEWGEN partners to meet the organisers and propose a special session during the E-MRS Fall meeting 2016 next September (with 24 speakers, and opportunity to be published in the Journal “Advanced Healthcare Materials” (Publisher: Wiley, IF of 5.797 in 2015, indexed in Scopus and Web of Science
Hyperlink	http://www.european-mrs.com/meetings/2016-spring

Item/activity	INERA Conference 2015: Light in Nanoscience and Nanotechnology (LNN 2015)
Target Audience	Participants from 13 different countries delivered 22 invited lectures, 17 oral and 46 poster presentations, contributing in 8 different topics. Papers submitted to the Proceedings were refereed according to the standards of the Journal of Physics: Conference Series and the accepted ones illustrate the diversity and the high level of the contributions. The Conference gave a good opportunity for interesting discussions and exchange of ideas between the participants. Not least, a significant factor for the success of the LNN 2015 was the social program, the relaxing spa facilities and the guided tour through the Roman remains of the town. The proceedings of conferences and workshops organized in the frames of INERA Project are regularly published by the Journal of Physics: Conference Series. We are grateful to the Journal's staff for providing us this opportunity.
Outcome of the activity	Oral talk: “Preliminary study of surface modification of 3D Poly (ε-caprolactone) scaffolds by ultrashort laser irradiation“; A. Daskalova (Bulgarian Academy of Sciences, BG)
Hyperlink	http://iopscience.iop.org/article/10.1088/1742-6596/682/1/012006

Item/activity	EUROMAT 2015 – 20-24 Septembre 2015 (Crakov, PL)
Target Audience	The EUROMAT conferences have been held every two years since 1989, and have an increased record of bringing together up to 2000 researchers, scientists, trainees, and students from both academia and industry to discuss critical developments and perspectives in the field of materials science and technology and their applications. In 2015, the symposia within the conference will be grouped under the main headings: (A) Functional Materials, (B) Structural Materials, (C) Processing, (D) Characterization and Modelling, (E) Energy and Environment, and (F) Biomaterials and Healthcare, and there will be additional contributions on (G) Education, Technology Transfer and Strategic Materials.
Outcome of the activity	Oral talk: “Process methods for close controlled pore size and morphology in ceramics”; A. Leriche (LMCPA-UVHC, FR)

Hyperlink	www.euromat2015.org

Item/activity	Bioengineering in Ireland, Galway, Ire, (Jan 2016)
Target Audience	Bioengineering in Ireland is now established as one of Ireland's longest-running and most active research conferences in engineering and science. The conference includes the presentation of the RAMI silver medal to the Haughton lecturer, and the RAMI Bronze medal to the presenter of the best paper at the conference. The conference is traditionally an occasion for young researchers and graduate students to present their work alongside senior researchers of international standing. The annual Engineers Ireland Biomedical Research Medal competition for PhD research will also take place in conjunction with the conference
Outcome of the activity	- Oral talk: "Synthesis and characterisation of hydrogel/bioceramic composites for bone regeneration applications"; T. Geever (Athlone Institute of Technology, IE) - Oral talk: "Novel Bioactive Composites Fabricated by Freezing-Thawing Method for Bone Generation Applications", M. Canillas (ICV, ES)
Hyperlink	https://bini2016.wordpress.com/

Item/activity	Introduction to the COST Framework Programme – 20 April 2016 (Riga, LV)
Target Audience	Organization by the COST Association - for future COST proposers
Outcome of the activity	Oral talk: "What is the added value and impact of participating in a COST Action? Examples of experience and best practice from COST Actions Representative"; J. Locs (Riga Technical Institute, LV)
Hyperlink	www.cost.eu

Item/activity	E-MRS Fall meeting 2016 - Session 4 "Advanced Materials and Technologies for Bone Engineering" supported by the special issue on the session subject of the journal Materials Science and Engineering C: Materials for Biological Applications (Elsevier) : The collaborative session E-MRS/ EU COST Action MP 1301 NEWGEN with Invited Presenters. Invited organizers/chairs: Dr Paola Palmero, Politecnico di Torino, Italy; Dr. Stephane Hocquet, BCRC (Member of EMRA), Mons, Belgium;
Target Audience	Since 2002, E-MRS has organized an annual Fall meeting in Warsaw, Poland which provides another opportunity for scientist in Central and Eastern Europe to become involved in the work of the E-MRS. The Fall Meeting offers the same high quality scientific platform as the Spring meeting and is growing in international involvement.
Outcome of the activity	- Keynote Presentation. "COST Action NEWGEN MP1301 - an Effective European network in Bone Tissue Engineering" Authors : Stéphane HOCQUET (CRIBC, BE), Paola PALMERO (Politecnico di Torino, IT), Francis CAMBIER (CRIBC, BE) - Keynote Lecture. Pure and Si-substituted Hydroxyapatite scaffolds: mechanical and biological assessment Authors : Paola Palmero (Politecnico di Torino, IT) - Stiffness and strength prediction for a hydroxyapatite-based biomaterial, considering bone regeneration Authors : Stefan Scheiner (Vienna University of Technology, AT), Vladimir S. Komlev (Russian Academy of Sciences), Alexey N. Gurin (Russian Academy of Sciences), Christian Hellmich (Vienna University of Technology, AT) - Silica-coated magnetic nanoparticles for bioimaging and drug delivery Authors : Marta LARANJEIRA (i3S- Instituto de Investigação e Inovação em Saúde, Universidade do Porto, PT), Yuki SHIROSAKI (Kyushu Institute of Technology, JPN), Saki YOSHIMATSU YASUTOMI (Kyushu Institute of Technology, JPN), Toshiki MIYAZAKI (Kyushu Institute of Technology, JPN), Fernando Jorge MONTEIRO (INEB-Porto) - Synthesis and characterisation of photopolymerised polymer-bioceramic hydrogel scaffolds for bone regeneration applications Authors : Geever, T. (Athlone Institute of Technology, IE) , Canillas Perez, M. (Instituto de Cerámica y Vidrio, ES), Vierira, K. (Laboratório de Avaliação e Desenvolvimento de Biomateriais, Campina Grande, Brazil), Rodríguez Barbero (Laboratório de Avaliação e Desenvolvimento de Biomateriais, Campina Grande, Brazil), M.A., Nugent, M.J.D. (Athlone Institute of Technology, IE), Devine, D.M. (Athlone Institute of Technology, IE) - Biocompatible and cytotoxicity studies on modified calcium phosphate coatings Authors : Monika Furko (Centre for Energy Research, Budapest, HU), Elena Della Bella, Milena Fini (Rizzoli Orthopaedic Institute, IT), Csaba Balázsi (Centre for Energy Research, Budapest, HU) - Antiresorptive materials based on octacalcium phosphate functionalized with

bisphosphonates. Authors : E. Boanini (University of Bologna, IT), P. Torricelli (University of Bologna, IT), L. Forte (University of Bologna, IT), M. Gazzano (University of Bologna, IT), C. Combes (Institut National Polytechnique de Toulouse ENSIACET - CIRIMAT, FR), M. Fini (Rizzoli Orthopaedic Institute, IT), A. Bigi (Rizzoli Orthopaedic Institute, IT) - Functionalization of phosphocalcic bioceramics for bone tissue engineering Authors : Chantal Damia (Université de Limoges, CNRS UMR 7315, SPCTS, FR), Vincent Chaleix (Université de Limoges, LCSN, FR), Vincent Sol (Université de Limoges, LCSN, FR), David Marchat (Ecole Nationale Supérieure des Mines de Saint-Etienne, CIS-EMSE, FR), Nathalie Douard (Ecole Nationale Supérieure des Mines de Saint-Etienne, CIS-EMSE, FR), Delphine Logeart (Université Denis Diderot, CNRS, FR), Nathanaël Larochette (Université Denis Diderot, CNRS, FR), Evelyne Poli (Université de Limoges, CNRS UMR 7315, SPCTS, FR), Charly Lemoine (Université de Limoges, CNRS UMR 7315, SPCTS, FR), Joël Brie (CHU de Limoges, FR), Eric Champion (Université de Limoges, CNRS UMR 7315, SPCTS, FR) - 2D and 3D image analysis of electrospun fibre scaffolds for bone tissue engineering Authors : Urszula Stachewicz (AGH University of Science and Technology, PL), Piotr Szewczyk (AGH University of Science and Technology, PL), Adam Kruk (AGH University of Science and Technology, PL), Asa H. Barber (Queen Mary University of London, UK) and Aleksandra Czyrska-Filemonowicz (AGH University of Science and Technology, PL) - Functional coatings deposited on titanium alloy by micro-arc oxidation for improved bone-implant integration Authors : Joanna Karbowniczek, Sara Metwally, Grzegorz Cempura, Aleksandra Czyrska-Filemonowicz (AGH University of Science and Technology, PL) - Mechanical and Physical Response of Nanocomposite-Coated Foams Subjected To Hydration: Potential Uses For Bone Tissue Scaffolds Authors : Jonathan Acheson (Queen's University Belfast, UK), Monika Ziminska (Queen's University Belfast, UK), Saurav Goel (Queen's University Belfast, UK), Nicholas Dunne (Dublin City Unviersity, IE), Andrew Hamilton (Queen's University Belfast, UK) - Strontium substituted and alendronate functionalized hydroxyapatite nanocrystals in an ovariectomized spinal arthrodesis model Authors : Salamanna F, Giavaresi G, Parrilli A, Torricelli P, Boanini E, Bigi A, Nicoli Aldini N, Fini M. (Rizzoli Orthopedic Institute and Unviersity of Bologna, IT) - Novel method of preparation of biphasic calcium phosphate scaffolds with controlled pore size distribution Authors : Lenka Novotna, Jaroslav Cihlar (CEITEC – Central European Institute of Technology, Brno, University of Technology, CZ) - Fabrication of directionally porous structures by freeze-casting and laser ablation Authors : A.del Valle(Instituto de Cerámica y Vidrio, CSIC, ES), C. Baudín (Instituto de Cerámica y Vidrio, CSIC, ES) and P. Pena (Instituto de Cerámica y Vidrio, CSIC, ES), D.Hautcoeur (CRIBC, BE), C. Ott (CRIBC, BE), V. Lardot (CRIBC, BE) and F. Cambier (CRIBC, BE) - New biomimetic amorphous calcium phosphate biomaterials: structure and thermal properties Authors : Jana Vecstaudza (Riga Technical University, LV), Michael Gasik (Aalto Unviersity, FI), Janis Locs (Riga Technical University, LV) - Fabrication and characterization of a multi-layer biomaterial for bone tissue engineering Authors : Clémence Petit, Paola Palmero, Jean-Marc Tulliani (Politecnico di Torino, IT) - Preparation and characterization of composites based on ternary biopolymeric blends with nano-hydroxyapatite Auhors : Alina Sionkowska, Beata Kaczmarek (Nicolaus Copernicus University in Torun, PL) - Micropatterning of calcium phosphate bioceramics by femtosecond laser Authors : Marie LASGORCEIX (CRIBC, BE), Cédric OTT (CRIBC, BE), Laurent BOILET (CRIBC, BE), Stéphane HOCQUET (CRIBC, BE), Véronique LARDOT (CRIBC, BE), Francis CAMBIER (CRIBC, BE), Anne LERICHE (LMCPA-UVHC, FR), Heidi DECLERCQ (Ghent University, BE), Maria CORNELISSEN (Ghent University, BE) - The optimization of titania nanotubes production on the surface of Ti6Al4V alloy in terms of their biomedical applications Authors : A.Radtke (Nicolaus Copernicus University in Torun, PL), P. Piszczek (Nicolaus Copernicus University in Torun, PL), A. Topolski (Nicolaus Copernicus University in Torun, PL), T. Jędrzejewski (Nicolaus Copernicus University in Torun, PL), W. Kozak (Nicolaus Copernicus University in Torun, PL), M. Więckowska-Szakiel (University of Lodz, PL), B. Sadowska (University of Lodz, PL), Magda Szubka (University of Silesia, PL), E. Talik (University of Silesia, PL), I. Hald Andersen (Tribology Centre, Danish Technological Institute, DK), L. Pleth Nielsen (Tribology Centre, Danish Technological Institute, DK) - Biomineralized Peptide Nanofibers for Bone Regeneration Authors : Ayse B. Tekinay (Bilkent University, TK) - Bioactivity improvement of 3D poly-?-caprolactone fiber matrices modified via fs laser surface irradiation Authors : A.Daskalova (Institute of Electronics, Bulgarian Academy of Sciences, BG), B. Ostrowska (Warsaw University of Technology, PL), W. wiszkowski (Warsaw University of Technology, PL), A. Trifonov (Sofia University "St. Kliment Ohridski", BG), I. Buchvarov (Sofia University "St. Kliment Ohridski", BG), C. Nathala (Vienna University of Technology, AT), A. Zhelyazkova (Institute of Electronics, Bulgarian Academy of Sciences, BG), K. Szlazak (Warsaw University of Technology, PL), M. Lojkowski (Warsaw University of Technology, PL), W. Husinsky (Vienna University of Technology, AT) - The influence of chemical polishing of

	titanium scaffolds on their mechanical strength and in-vitro cell response Authors : Bartlomiej Wysocki (Warsaw University of Technology, PL), Joanna Idaszek (Warsaw University of Technology, PL), Joseph Buhagiar (University of Malta, MT), Glenn Cassar (University of Malta, MT), Karol Szlązak (Warsaw University of Technology, PL), Tomasz Brynk (Warsaw University of Technology, PL), Krzysztof J. Kurzydlowski (Warsaw University of Technology, PL), Wojciech Swieszkowski (Warsaw University of Technology, PL) - Bioresource and Bioadhesive Polymer based Hydrogel Scaffolds for Health Care Applications Authors : Nabanita Saha, Rushita Shah, Haojei Fei, Takeshi Kitano and Petr Saha (Polymer Centre, Faculty of Technology, Tomas Bata University in Zlin, CZ) - PVP-CMC Hydrogel : An Excellent Bioinspired and Biocompatible Scaffold for Osseointegration Authors : Nabanita Saha (Polymer Centre, Faculty of Technology, Tomas Bata University in Zlin, CZ), Rushita Shah (Polymer Centre, Faculty of Technology, Tomas Bata University in Zlin, CZ), Prerak Gupta (Indian Institute of Technology), Biman B. Mandal (Indian Institute of Technology), Radostina Alexandrova (Bulgarian Academy of Sciences, BG), Maja Dutour Sikiric (Ruđer Bošković Institute Zagreb, HR), Petr Saha (Polymer Centre, Faculty of Technology, Tomas Bata University in Zlin, CZ) - O2 distribution within 3-D matrices for tissue engineering Authors : P Wolff, E Amann, M van Griensven, ER Balmayor (Experimental Trauma Surgery, Klinikum rechts der Isar, Technical University of Munich, Munich, DE) - Self-Assembling Osteogenic Nanoparticle Delivery via a Thermoresponsive Nanofibre Reinforced Hydrogel Authors : Nicholas Dunne (Dublin City University, IE), Philip Chambers (Queen's University Belfast, UK), Michelle O'Doherty (Queen's University Belfast, UK), Sree Pentlavalli (Queen's University Belfast, UK), Marine Chalanqui (Queen's University Belfast, UK), Binulal Sathy (Trinity Centre for Bioengineering, IE), Hannah Pauly 4, Daniel J Kelly (Trinity Centre for Bioengineering, IE), Tammy L. Haut Donahue (Orthopaedic Bioengineering Research Laboratory, USA), Helen O. McCarthy (Queen's University Belfast, UK) - Keynote Presentation. Bone tissue engineering: an overview of recent advances and future trends Authors : Paola Palmero (Politecnico di Torino), Stéphane Hocquet (CRIBC, BE), Francis Cambier (CRIBC, BE)
Hyperlink	https://www.european-mrs.com/bioinspired-and-biointegrated-materials-frontiers-nanomaterials-vi-emrs

The following other dissemination activities reported by the Action were not effective or added no value

Exploitation activities

The following activities to ensure exploitation (use, in particular in a commercial context) of the Action's achievements reported by the Action were effective and added value

Item/activity	Start-up Company SEQVERA Ltd (www.seqvera.com)
Target Audience	Seqvera offers worldwide several products and solutions for the core application areas for producers of medical devices, biomaterials, tissue engineering and hybrid applications, contract research organizations, laboratories, universities, clinics and testing bodies.
Outcome of the activity	- Special testing devices (standard and customized) in a proper combination for applications - Specialized supplies such as reference materials, sample holders, spare parts and components - Experimental testing services - Training and consulting, including assistance in ddevelopment of tailored products - Adjacent testing equipment and supplies for biomaterial evaluation - Service and maintenance of equipment

Item/activity	Start-up Company ASKEL HEALTHCARE Ltd. (www.askelhealthcare.com)
Target Audience	The mission is to provide evidence-based orthopedic treatments to veterinary surgeons globally. The COPLA Scaffold(TM) is the most effective solution for cartilage repair and prevention of osteoarthritis and could benefit tens of thousands of animal patients each year
Outcome of the activity	Regenerative solution for cartilage repair : the COPLA scaffold(TM) is a 3D biodegradable composite of polylactide and non-animal derived collagen for cartilage repair in weight bearing joints. It can be used in different cartilage locations, in different species and for full thickness chondral or osteochondral lesions. Available for animal healthcare

Item/activity	Advances in Ceramic Biomaterials Edited by Paola Palmero, Francis Cambier and Eamonn de Barra WP - woodhead Publishing ISBN 978-0-08-100881-2
Target Audience	Materials research scientists, biologists, engineers, clinicians
Outcome of the activity	Book edited and already available

Item/activity	DirectInject(TM) product, Stryker
Target Audience	Surgeons
Outcome of the activity	DirectInject is a self-setting, calcium phosphate cement intended to repair neurosurgical burr holes, contiguous craniotomy cuts and other cranial defects not intrinsic to the stability of the bony structure. It is also intended for augmentation or restoration of bony contour in the craniofacial skeleton to include the cranial and zygomatic bones. DirectInject is intended to repair cranial defects with a surface area of 4 cm2 or less. DirectInject is indicated for patients in whom skeletal growth is complete. It can be used in patients with surgically created bone defects.

Assessment of Action Dissemination and Exploitation Approach

The effectiveness of the Action's dissemination and exploitation approach (other than co-authored publications) is assessed as follows The approach is evaluated as appropriate and effective.

Assessment of Action dissemination and exploitation activities

The assessment is:

All Action activities focusing on dissemination of Action results were effective [Very Good]
All Action activities focusing on exploitation of Action results were effective [Very Good]

Action Success(es)

The following table shows the success(es) reported by the Action and the Action Rapporteur's comment.

Success reported by Action	Action Rapporteur comment
6 European projects have been funded within the 4 years of the Action, as a result of collaboration between NEWGEN partners. Within the consortium in these projects, companies and medical groups actively participate, achieving one of our main objective : reducing the gap between R&D, production and end-users (surgeons and patients as well).	This is indeed one of the big successes of the Action. Not only is the number of granted European projects high, but they also involve different stakeholders, from academia and industry, which probably could not have been achieved without this action.
All the dissemination activities are involved in the full success of our COST Action: edition of a book, joint scientific publications, start-up companies and newly developed commercial product, etc. Again the networking activities funded by the COST must be emphasized as none of these achievements would have been possible without having a framework for people to meet and develop their collaboration. For instance, a major part of the joint publications listed in this report results from the work in collaboration performed during STSMs. And many STSMs are the consequence of initial discussions between partners during workshops and meetings organized within our COST Action.	This success is well justified. This COST action was active and successful in dissemination activities, which made a scientific, technological and societal impact contributed to building the capacity in the field of biomaterials.

Other matters

This section is confidential to the Management Committee, and the COST Association (Administration, Scientific Committee and Committee of Senior Officials), and is not included in the version of the report that is published on the COST website.

Difficulties in implementing the Action

The Action Rapporteur did not report having observed any difficulties in the implementation of the Action.

Suggestions for improvements to COST framework/ procedures

The Action Rapporteur did not suggest any changes to the COST framework .

Emerging topics / developments in the field of the Action

The Action reported the following emerging topics/ developments in the field of the Action.

- One of the main scientific subjects addressed during our meetings was the evaluation of biomaterials by means of in-vitro tests. Conferences or workshops helping 1) at developing a kind of mapping of existing tests and 2) at deciding what tests need to be performed in order to characterize the developed biomaterials, should be considered as interesting for the scientific community (or at least Materials scientists and young researchers, not used with biological assessment).

The Action Rapporteur did not make any comment on the emerging topics/ developments in the field reported by the Action.

Action Rapporteur

This Final Assessment Report was submitted on 2017-12-07 by:
Dr Pamela Habibovic
University of Twente
Netherlands

Annex 1: List of publications

The Action reported 34 publications on the topic of the Action, co-authored by at least two Action participants from two countries participating in the Action, and for which the Action networking was necessary.

Co-authored Action publications - peer-reviewed

- I. Ghaeli, M.A. de Moraes, M.M. Beppu, K. Lewandowska, A. Sionkowska, F. Ferreira-da-Silva, M.P. Ferraz, F.J. Monteiro. Phase Behaviour and Miscibility Studies of Collagen/Silk Fibroin Macromolecular System in Dilute Solutions and Solid State. Molecules 2017, 22, 1368; doi:10.3390/molecules22081368

- B. Kaczmarek, A. Sionkowska, F.J. Monteiro, A. Carvalho, K. Łukowicz, A.M. Osyczka; Characterization of gelatin and chitosan scaffolds cross-linked by dialdehyde starch addition, Biomedical Materials, in press https://doi.org/10.1088/1748-605X/aa8910

- K. Lewandowska, G. Furtos, Characterisation of thin chitosan films for guided tissue regeneration purposes, Progress on Chemistry and Application of Chitin and Its Derivatives, volume XXII, Polish Chitin Society, Lodz, 2017, 118-124

- A. Bachar, C. Mercier, A. Tricoteaux, A. Leriche, C. Follet-Houttemane, M. Saadi, S. Hampshire, 2013, Effects of Nitrogen on Properties of Oxyfluoronitride Bioglasses, Process Biochemistry, Vol. 48, 89–95.

- A. Bachar, C. Mercier, A. Tricoteaux, S. Hampshire, A. Leriche, C. Follet, 2013, Effect of nitrogen and fluorine on mechanical properties and bioactivity in two series of bioactive glasses, Journal of Mechanical Behavior of Biomedical Materials, Vol. 23, 133-148.

- R. Catteaux, I. Grattepanche-Lebecq, F. Désanglois, F. Chai, J.C. Hornez, S. Hampshire, C. Follet-Houttemane, 2013, Synthesis, characterization and bioactivity of bioglasses in the Na2O-CaO-P2O5-SiO2 system prepared via sol gel processing, Chemical Engineering Research and Design, Vol. 91 [12], 2420-2426.

- A. Bachar, C. Mercier, A. Tricoteaux, J.-C. Hornez, A. Leriche, C. Follet, B. Revel, S. Hampshire, M. R. Towler*, 2015, Effect of Nitrogen on Properties of Na2O–CaO–SrO–ZnO–SiO2 Glasses, Journal of the American Ceramic Society, Vol. 98 [3], 748-757.

- Ahmed Bachar, Cyrille Mercier, Claudine Follet, Nicolas Bost, Fouad Bentiss, Stuart Hampshire, 2016, An Introduction of the fluorine and nitrogen on properties of Ca-Si-Al-O Glasses, Journal of Materials and Environmental Science Vol. 7 (1), 347-355

- Ahmed Bachar, Cyrille Mercier, Arnaud Tricoteaux, Anne Leriche, Claudine Follet, Stuart Hampshire, 2016, Bioactive Oxynitride Glasses: Synthesis, Structure and Properties, Journal of the European Ceramic Society, Vol. 36 (12), 2869–2881

- A Daskalova, I Bliznakova, E Iordanova, G Yankov, M Grozeva and B Ostrowska; "Preliminary study of surface modification of 3D Poly (ε -caprolactone) scaffolds by ultrashort laser irradiation", Journal of Physics: Conference Series 682,2016, doi:10.1088/1742-6596/682/1/012006

- Maria Canillas, Gabriel G. de Lima, Miguel A. Rodríguez, Michael J. D. Nugent, Declan M. Devine; "Bioactive composites fabricated by freezing-thawing method for bone regeneration application"; J. Polym. Sci. B : Polym. Phys.; Volume 54, Issue 7,1 April 2016, Pages 761–773

- A. Radtke, P. Piszczek, A. Topolski, Z. Lewandowska, E. Talik, I. Hald Andersen, L. Pleth Nielsen, M. Heikkila, M. Leskela; “The structure and the photocatalytic activity of titania based nanotube and nanofiber coatings”; Applied Surface Science, Vol368 – 15 April 2016; pp 165-172

- S. Schienle, A. Al-Ahmad, R. Kohalf, F. Bernsmann, E. Adolfsson, L. Montanara, P. Palmero, T. Fürderer, J. Chevalier, E. Hellwig, L. Karygianni; “Microbial adhesion on novel yttria-stabilized tetragonal zirconia (Y-TZP) implant surfaces with nitrogen-doped hydrogenated amorphous carbon (a-C:H:N) coatings”; Clin Oral Investig. 2016 Sep;20(7):1719-32. doi: 10.1007/s00784-015-1655-5. Epub 2015 Nov 27

- Henriques, B., Miranda, G., Gasik, M., Souza, J.C.M., Nascimento, R.M., Silva, F.S. Finite element analysis of the residual thermal stresses on functionally gradated dental restorations. J. Mech. Behavior Biomed. Mater., 50 (2015), 123-130.

- Aghayan, M., Gasik, M., Hussainova, I., Rubio-Marcos, F., Kollo, L., Kübarsepp J. Thermal and microstructural analysis of doped alumina nanofibers. Thermochim. Acta 602 (2015), 43-48

- Henriques, B., Bagheri, A., Gasik, M., Souza, J.C.M., Carvalho, O., Silva, F.S., Nascimento, R.M. Mechanical properties of hot pressed CoCrMo alloy compacts for biomedical applications. Mater. Design, 83 (2015), 829-834

- Kazantseva J., Ivanov R., Gasik M., Neuman T., Hussainova I. Graphene-augmented nanofiber scaffolds demonstrate new features in cells behaviour. Sci Rep. 2016; 6: 30150.

- E. Meurice, F. Bouchart, J.C. Hornez, A. Leriche, D. Hautoceur, V. Lardot, F. Cambier; M. H. Fernandes, F. J. Monteiro; "Osteoblastic cells colonization inside b-TCP macroporous structures obtained by ice-templating”; Journal of European Ceramic Society; 36 (12); 2895-2901; 2016

- A-M Stanciuc, C. M. Sprecher, J. Adrien, L. I. Roiban, M. Alini, L. Gremillard, M. Peroglio, "Robocast zirconia-toughened alumina scaffolds: processing, structural characterization and interaction with human primary osteoblasts", J. Eur. Ceram. Soc., in press, https://doi.org/10.1016/j.jeurceramsoc.2017.08.031

- C. Balazsi, M. Furko, E. Della Bella, M. fini, "Biocompatible and citotoxicity studies on modified calcium phosphate coatings", Mat. Sci. & Eng. C, submitted (2017)

- U. Stachewicz, P. Szewczyk, A. Kruk, A. H. Barber, A. Czyrska-Filemonowicz, "Pore shape and size dependence on cells growth into electrospun fiber scaffolds for tissue engineering: 2D and 3D analyses using SEM and FIB-SEM tomography", Mat. Sci. & Eng. C, submitted

- N. Saha, R. Shah, P. Gupta, B. Mandal, R. Alexandrova, M. Dutour Sikiric, P. Saha, "PVP - CMC Hydrogel: An Excellent Bioinspired and Biocompatible Scaffold for Osseointegration", Mat. Sci. & Eng. C, submitted

- J. Vecstaudza, M. Gazik, J. Locs, "New biomimetic amorphous calcium phosphate biomaterials: structure and thermal properties", Mat. Sci. & Eng. C, submitted

- M. Lasgorceix, C. Ott, L. Boilet, S. Hocquet, V. Lardot, F. Cambier, A. Leriche, H. Declercq, M. Cornelissen, "Micropatterining of calcium phosphate bioceramics by femtosecond laser", Mat. Sci. & Eng. C, submitted

- B. Wysocki, J. Idaszek, J. Buhagiar, K. Szlazak, T. Brynk, K. J. Kurzydlowski, W. Swieszkowski, "The influence of chemical polishing of titanium scaffolds on their mechanical strength and in-vitro cell response", Mat. Sci. & Eng. C, submitted

- A. Radtke, P. Piszczek, A. Topolski, T. Jedrzejewski, W. Kozak, M. Wieskowska-Szakiel, B. Sadowska, M. Szubka, E. Talik, I. Hald Andersen, L. Pleth Nielsen, "The optimization of titania nanotubes production on the surface of Ti6Al4V alloy in terms of their biomedical applications", Mat. Sci. & Eng. C, submitted

- A. Daskalova, B. Ostrowska, W. Wieszkowski, A. Trifinov, I. Buchvarov, C. Nathala, A. Zhelyazkova, M. Lojkowski, W. Husinsky, "Bioactivity improvement of 3D poly-e-caprolactone fiber

matrices modified via fs surface irradiation, Mat. Sci. & Eng. C, submitted

- Furtos Gabriel, Pascuta Petru, Cadar Oana, Camilleri Josette, The use of bismuth-based glass as radiopacifier with tricalcium silicate cement for endodontic applications, APPLIED COMPOSITE MATERIALS (submitted)

- A. Daskalova, C. S.R. Nathala, P. Kavatzikidou, A. Ranella, R. Szoszkiewicz, W. Husinsky, C. Fotakis, ''FS laser processing of bio-polymer thin films for studying cell-to-substrate specific response'', Applied Surface Science, 382, 178–191, 2016, IF- 3.150

- Lucia Forte, Stéphanie Sarda, Christèle Combes, Fabien Brouillet, Massimo Gazzano, Olivier Marsan, Elisa Boanini, Adriana Bigi Hydroxyapatite functionalization to trigger adsorption and release of risedronate Colloids and Surfaces B: Biointerfaces; doi: 10. 1016/ j. colsurfb. 2017. 09. 055

- B Wysocki, P Maj, R Sitek, J Buhagiar, KJ Kurzydłowski, W Święszkowski; Laser and Electron Beam Additive Manufacturing Methods of Fabricating Titanium Bone Implants; Applied Sciences 7 (7), 657 (2017)

- Garcia-Prieto, A., Hornez, J.C., Leriche, A., Pena, P., Baudín, C.; "Influence of porosity on the mechanical behaviour of single phase β-TCP ceramics"; Ceram. Int., 43(8), pp. 6048-6053 (2017)

- Gabriel G. de Lima, Fanny Traon, Elouan Moal, Maria Canillas, Miguel A. Rodriguez, Helen O. McCarthy, Nicholas Dunne, Declan M. Devine, Michael J.D.; "Composite cryogels for dual drug delivery and enhanced mechanical properties"; Polymer Composites - DOI: 10.1002/pc.24450 (2017)

- A. Daskalova, I. Bliznakova, A. Trifonov, I. Buchvarov, C. R. Nathala, W. Husinsky, ''Morphological characterization of chitosan biopolymer thin films modified via fs irradiation and its potential application as functional surfaces in regenerative medicine'', Proceedings of SPIE, 2017, doi:10.1117/12.2262679