

PIERGIORGIO GENTILE, Ph. D.

PERSONAL DETAILS

PIERGIORGIO GENTILE

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Nationality Italian
Date of birth April 24th, 1982

EDUCATION

Politecnico di Torino 2007–2009

European Ph.D. in Biomedical Engineering. *Thesis: Engineering of bioactive polymeric or composite scaffolds for bone tissue regeneration.* (Prof. Gianluca Ciardelli, Prof. George Goergiev, Prof. Chiara Vitale-Brovarone)

Politecnico di Torino 2005–2006

M.S. in Biomedical Engineering (110/110). *Thesis: Enzymatically crosslinked porous composite matrices for bone tissue regeneration.* (Prof. Gianluca Ciardelli)

Politecnico di Torino 2001–2004

B.S. in Biomedical Engineering (110/110). *Thesis: The treatment of scoliosis using Chêneau corset.* (Prof. Cristina Bignardi)

EMPLOYMENT AND RESEARCH EXPERIENCE

Politecnico di Torino, Department of Mechanics, Turin, Italy 2010–present

Post-Doc Research Fellow within the regional project ACTIVE (“Advanced Cardiovascular Therapies”). Research manager Prof. Franco M. Montevecchi.

- Realization and characterization of polymeric biomaterials for myocardial regeneration in the form of patches or injectable scaffolds.

University of Minho, Dep. of Polymer Engineering, 3B's Group, Braga, Portugal 2009 May–July

Ph. D. Student, Laboratory of Prof. Rui Reis

- Improvement of the bioactive properties of polymeric scaffolds through the incorporation of photozymes. The work dealt with the preparation of polymeric scaffolds (chitosan, CH), containing photozyme (Chitosan–Fluorescein, CHFL) through the wet spinning method.

Politecnico di Torino, Dep- of Mechanics, Turin, Italy – Brunel University, London, UK **2008**
Collaboration for scientific research within “British Programme, Cardiac Tissue Engineering”.
Research manager Prof. Gianluca Ciardelli – Prof. Quan Long

Politecnico di Torino, Department of Mechanics, Turin, Italy **2007–2008**
Collaboration for scientific research within regional project BIADS (“Novel biomaterials for intraoperative adjustable devices for fine tuning of prostheses shape and performance in surgery”).
Research managers Prof. Franco M. Montevercchi – Prof. Gianluca Ciardelli.

- Mechanical characterization of a cardiovascular device based on synthetic polymer (polylactic acid, polyglycolic acid, polyester urethane)

Politecnico di Torino, Department of Mechanics, Turin, Italy **2007**
Collaboration for scientific research within “High Performance Industrial Protein matrices through bioprocessing–HIPERMAX, NMP3–CT–2003–505790”. Research manager Prof. Gianluca Ciardelli.

- Realization and characterization of enzymatically – crosslinked porous composite matrices for bone tissue regeneration

Politecnico di Torino, Department of Mechanics, Turin, Italy **2007–2009**
Ph. D. Student within the Industrial Bioengineering Group, managed by Prof. Franco M. Montevercchi and Prof. Gianluca Ciardelli

- Scientific research within the European project PHOTONANOTECH, NMP4–CT–2007–033168 “Photozyme Nanoparticle Applications for Water Purification, Textile Finishing, Photodynamic Biomineralization and Biomaterials Coating”. Research manager Prof. Gianluca Ciardelli. Experimental studies to investigate physico–chemical properties of photoactive copolymers (photozymes) and to evaluate the biological response to these new generation polymers into scaffolds or functionalized surfaces.

RELEVANT SKILLS

Technical and instrumental skills

–Melt–extrusion; Brabender Plasticorder; Instrumentation for polymer solution spinning (electrospinning and dry/wet spinning); Mechanical press injection molding, Freeze–drying.

–Optical microscopy; Contact angle measurements; Fourier Transform Infrared Spectroscopy (FTIR); Differential scanning calorimetry (DSC); Thermogravimetric analysis (TGA); Viscosimeter, Capillary rheometer, Mechanical tester, Nanoindenter.

Computer skills and competences

Windows, MS Office, Photoshop, Corel Draw, Origin, Matlab, Image J, Ansys, Mimics, Rhino and Hypermesh.

FELLOWSHIP AND AWARDS

Funded Visit Program at Weizmann Institute of Science (WIS) **2011**
Department of Materials & Interfaces– Lab. Soft Matters and Interfaces, Prof. Jacob Klein. Rehovot, Tel Aviv, Israel.

Politecnico di Torino, Department of Mechanics, Turin, Italy **2010–present**
Post-Doc Research Fellow within the regional project ACTIVE (“Advanced Cardiovascular Therapies”)

Italian National Bioengineering Group (GNB), “Alberto Mazzoldi” *PhD Thesis Award* **2010**

TEACHING EXPERIENCE

Politecnico di Torino, Department of Mechanics, Turin, Italy **2011**
Teaching Assistant for the course “Tissue engineering and biotech applications”, (13 lecture hours).

Politecnico di Torino, Department of Mechanics, Turin, Italy **2011**
Teaching Assistant for the course “and bioinspired systems: application to biomedical engineering”, (3 lecture hours).

Politecnico di Torino, Department of Mechanics, Turin, Italy **2010**
Teaching Assistant for the course “Biomaterials II”, (3 lecture hours).

Politecnico di Torino, Department of Mechanics, Turin, Italy **2009**
Teaching Assistant for the course “Physico-Chemical Processes in Biological Systems”, (16 lecture hours).

Politecnico di Torino, Department of Mechanics, Turin, Italy **2008**
Teaching Assistant for the course “Bionanotechnologies”, (4 lecture hours).

Politecnico di Torino, Department of Mechanics, Turin, Italy **2008**
Teaching Assistant for the course “Physico-Chemical Processes in Biological Systems”, (14 lecture hours).

PATENTS

G Ciardelli, **P Gentile**, C Tonda Turo, V Chiono, C. Mattu, A.M. Ferreira-Duarte. “Biomimetic and biodegradable polymeric bone cements for vertebroplasty” Italian Patent number TO2011A000549, issued Jun. 23, 2011.

G Ciardelli, C Tonda Turo, **P Gentile**, and V Chiono. “Implantable prosthesis device for hernia repair” Italian Patent number TO2010A000726, issued Aug. 31, 2010.

PUBLICATIONS

Journal articles

[P1] **P Gentile**, V Chiono, C Tonda-Turo, A M Ferreira Duarte and G Ciardelli. Polymeric membranes for guided bone regeneration. *Biotechnol J* Accepted.

- [P2] A Francesko, S Tourino, C Mattu, **P Gentile**, V Chiono, G Ciardelli and T Tzanov (2011). "Cross-linked collagen sponges loaded with plant polyphenols with inhibitory activity towards chronic wound enzymes", *Biotechnol J Accepted*.
- [P3] C Tonda-Turo, **P Gentile**, S Saracino, V Chiono, V K Nandagiri, G. Muzio, R A Canuto and G Ciardelli (2011). "Comparative analysis of gelatin scaffolds crosslinked by genipin and silane coupling agent", *Int J Biol Macromol* (doi:10.1016/j.ijbiomac.2011.07.002).
- [P4] V K Nandagiri, **P Gentile**, V Chiono, C Tonda-Turo, A Matsiko, Z Ramtoola, F M Montevecchi and G Ciardelli (2011). "Incorporation of PLGA nanoparticles into porous chitosan-gelatin scaffolds: influence on the physical properties and cell behaviour", *J Mech Behav Biomed Mater* (doi:10.1016/j.jmbbm.2011.04.019).
- [P5] C Tonda-Turo, C Audisio, S Gnani, V Chiono, **P Gentile**, S Raimondo, S Geuna, I Perroteau, and G Ciardelli (2011). "Porous Poly(ϵ -Caprolactone) Nerve Guide Filled with Porous Gelatin Matrix for Nerve Tissue Engineering", *Adv Eng Mater* 13(5) B151 (doi: 10.1002/adem.201080099).
- [P6] **P Gentile**, V Chiono, C Tonda-Turo, S Sartori, and G Ciardelli (2010). "Biomimetic materials for medical application through enzymatic modification", *Adv Biochem Engin/Biotechnol*, In press. (doi:10.1007/10_2010_85).
- [P7] D Bellucci, A Sola, **P Gentile**, G Ciardelli, and V Cannillo (2010). "Potassium Based Bioactive Glass for Bone Tissue Engineering", *Ceram Int* 36 2449 (doi:10.1016/j.ceramint.2010.07.009).
- [P8] G Ciardelli, **P Gentile**, V Chiono, M Mattioli-Belmonte, G Vozzi, N Barbani, and P Giusti (2010). "Enzymatically - Crosslinked Porous Composite Matrices For Bone Tissue Regeneration", *J Biomed Mater Res A* 92 137 (doi: 10.1002/jbm.a.32344).
- [P9] **P Gentile**, V Chiono, F Boccafoschi, F Bains, C Vitale-Brovarone, E Vernè, N Barbani, and G Ciardelli (2010). "Composite films of gelatin and hydroxyapatite/bioactive glass for tissue engineering applications", *J Biomater Sci Polymer Ed* 21 1207 (doi: 10.1163/092050609X12481751806213).
- [P10] V Chiono, **P Gentile**, F Boccafoschi, M Ninov, I Carmagnola, V Georgieva, G Georgiev, and G Ciardelli (2010). "Photoactive Chitosan Switching on Bone-Like Apatite Deposition", *Biomacromol* 11 309 (doi: 10.1021/bm901169v).
- [P11] E Nieddu, L Mazzucco, **P Gentile**, T Benko, V Balbo, R Mandrile, F Boccafoschi, and G Ciardelli (2009). "Preparation and biodegradation of clay composites of PLA", *React Funct Polym* 69 371 (doi:10.1016/j.reactfunctpolym.2009.03.002).
- [P12] V Chiono, G Ciardelli, G Vozzi, J Cortez, N Barbani, **P Gentile**, and G Ciardelli (2008). "Enzymatically-Modified Melt-Extruded Guides for Peripheral Nerve Repair", *Eng Life Sci* 8(3) 226 (doi: 10.1002/elsc.200700069).

Submitted papers

[S1] **P Gentile**, M Mattioli–Belmonte, V Chiono, C Ferretti, F Bairo, C Tonda–Turo, C Vitale–Brovarone, I Pashkuleva, R L Reis and G Ciardelli. Bioactive composite scaffolds mimic bone tissue. *Journal of Biomedical Materials Research Part A*.

[S2] V Chiono, I Carmagnola, **P Gentile**, F Boccafoschi, C Tonda–Turo, V Georgieva, G Georgiev and G Ciardelli. Layer–by–Layer Coating of Photoactive Polymers for Biomedical Applications. *Surface And Coatings Technology*.

[S3] C Tonda–Turo, E Cipriani, S Gnavi, V Chiono, C Mattu, **P Gentile**, I. Perroteau, M. Zanetti and G. Ciardelli. Crosslinked gelatin nanofibrous matrices for nerve tissue engineering. *Journal of Neural Engineering*.

[S4] D. Bellucci, V. Cannillo, F. Chiellini, G. Ciardelli, M. Gazzarri, **P. Gentile** and A. Sola. Processing and characterization of innovative scaffolds for bone tissue engineering. *Journal of Materials Science: Materials in Medicine*.

Book chapters

[B1] V Chiono, E Descrovi, S Sartori, **P Gentile**, M Ballarin, F Giorgis, and G Ciardelli (2011). “Biomimetic Tailoring of the Surface Properties of Polymers at the Nanoscale: Medical Applications. Scanning Probe” in *NanoScience and Technology, Scanning Probe Microscopy in Nanoscience and Nanotechnology 2, Part 3*, pp.645–689.

[B2] V K Nandagiri, V Chiono, **P Gentile**, F M Montevecchi, and G Ciardelli (2011). “Biomaterials of natural origin in regenerative medicine.” *Polymeric Biomaterials*. vol. 1, CRC Press/Taylor and Francis Group.

Proceedings

[C1] (a) **P Gentile**, M Mattioli–Belmonte, F Bairo, C Tonda–Turo, V Chiono, C Vitale–Brovarone, G Ciardelli. “Bioactive composite scaffolds mimic bone tissue”; (b) C Tonda–Turo, V Chiono, **P Gentile**, S Gnavi, E Cipriani, M Zanetti, I Perroteau, G Ciardelli. “Crosslinked gelatin nano fibre scaffolds for peripheral nerve tissue engineering”; (c) V Chiono, I Carmagnola, F Boccafoschi, **P Gentile**, C Tonda–Turo, M D P Camacho Leal, G Ciardelli. “Tailoring of surface properties at the nano scale by layer–by–layer technique” (2011). In: *TERMIS–EU, Granada, Spain (Histology and Histopathology. Cellular and Molecular Biology, 26 (1), 41,154,155)*, Oral presentation.

[C2] **P Gentile**, V Chiono, C Tonda–Turo, F Boccafoschi, C Vitale Brovarone, F Bairo, R Reis, M Mattioli–Belmonte, G Ciardelli. “Composite porous scaffolds based on natural polymers for bone tissue engineering” (2010). In: *7th International Conference on Polymer and Textile Biotechnology, Milan, Italy* Oral presentation.

[C3] (a) V Chiono, C Tonda–Turo, C Audisio, E Cipriani, **P Gentile**, S Geuna, M Zanetti, I Perroteau, and G Ciardelli. “Biomimetic guidance channels for peripheral nerve regeneration”; (b) V Chiono, **P**

Gentile, I Carmagnola, A M Ferreira-Duarte, F Boccafoschi, V Toncheva, G Georgiev, and G Ciardelli. "Photo-activated deposition of bone-like apatite by innovative photosensitive copolymers" (2010). In: SIB – National Congress of Biomaterials, Camogli, Italy Oral presentation.

[C4] (a) **P Gentile**, V Chiono, F Baino, F Boccafoschi, I Carmagnola, A M Ferreira-Duarte, I Pashkuleva, C Mattu, L R Reis, C Vitale-Brovarone, G Georgiev, and G Ciardelli. "Engineering of bioactive polymeric or composite scaffolds for bone tissue regeneration"; (b) A M Ferreira-Duarte, V Chiono, I Carmagnola, **P Gentile**, C Mattu, and G Ciardelli. "Surface modification of silicone prostheses by plasma treatment for further grafting with Chitosan-Rose Bengal"; (c) G Falvo D'Urso Labate, F Mastrangelo, F D'Agostino, A F Rodriguez Ruiz, **P Gentile**, M A Deriu, U Morbiducci, and F M Montevecchi. "Upgrade of a bioreactor for soft tissue engineering"; (d) A Gambino, C Tonda-Turo, V Chiono, **P Gentile**, A Sacco, C Mattu, and G Ciardelli. "Chitosan porous biocompatible membranes for peripheral nerve regeneration"; (e) C Tonda-Turo, C Audisio, E Cipriani, **P Gentile**, V Chiono, S Geuna, M Zanetti, I Perroteau, and G Ciardelli. "Biomimetic scaffolds for peripheral nerve regeneration"; (f) I Carmagnola, V Chiono, **P Gentile**, A M Ferreira-Duarte, C Mattu, I Pashkuleva, L R Reis, G Georgiev, and G Ciardelli. "Nanostructured coating via Layer-by-layer of photoactive polymers for tissue engineering"; (g) V K Nandagiri, **P Gentile**, V Chiono, C Mattu, G Ciardelli, F M Montevecchi, and Z Ramtoola. "Porous chitosan-gelatin scaffolds embedded with PLGA nanoparticles for bone repair" (2010). In: GNB – Second National Congress of Bioengineering, Turin, Italy Poster presentation.

[C5] A Gambino, A Sacco, C Tonda-Turo, V Chiono, **P Gentile**, C Mattu, and G Ciardelli. "Chitosan porous membranes nerve guides" (2010). In: CIMTEC – 5th Forum New Materials, Montecatini Terme, Italy Poster presentation.

[C6] (a) V Chiono, **P Gentile**, I Carmagnola, A M Ferreira-Duarte, F Boccafoschi, V Toncheva, G Georgiev, and G Ciardelli. "Chitosan based photozymes switching on bone-like apatite deposition"; *(b) **P Gentile**, F Baino, V Chiono, C Tonda-Turo, F Boccafoschi, A M Ferreira-Duarte, C Vitale-Brovarone, E Vernè, and G Ciardelli. "Bioactive and resorbable glass/gelatin composite scaffolds for bone tissue engineering". (2010). In: TERMIS-EU, Galway, Ireland Poster presentation

[C7] (a) R Mandrile, G Ciardelli, **P Gentile**, G Vasario, B Battiston, and P Tos "Biodegradable polymeric device repairing ruptured flexor tendons" (b) C Tonda-Turo, V Chiono, S Sartori, **P Gentile**, and G Ciardelli. "Nanostructured scaffolds for peripheral nerve reconstruction" (2009). In: COST Action 868 Biotechnical Biopolymers in Textile, Packaging, Cosmetics and Medical Applications Istanbul, Turkey Poster presentation.

[C8] **P Gentile**, F Baino, V Chiono, F Boccafoschi, C Tonda-Turo, C Vitale-Brovarone, E Vernè, and G Ciardelli. "Bioactive and resorbable glass/gelatin composite scaffolds for bone tissue engineering". In: Ceramics, Cells and Tissues 12th Annual Seminar & Meeting, Faenza, Italy Oral presentation.

[C9] V Chiono, I Carmagnola, **P Gentile**, F Boccafoschi, C Tonda-Turo, G Ciardelli, G Georgiev, M Ninov, T Georgieva, I Pashkuleva, and L R Reis. "Layer-by-Layer Coating of Photoactive Polymers for Biomedical Applications" (2009). In: IEEE Nano 2009, Genova, Italy Oral presentation.

[C10] **P Gentile**, V K Nandagiri, C Tonda–Turo, V Chiono, C Mattu, L Ruo, and G Ciardelli. “Bioactive and resorbable glass/gelatin composite scaffolds for bone tissue engineering” (2009). In: 22nd European Conference on Biomaterials, Lausanne, Switzerland Poster presentation.

[C11] V Chiono, I Carmagnola, **P Gentile**, F Boccafoschi, C Tonda–Turo, G Georgiev, M Ninov, V Georgieva, I Pashkuleva, R L Reis, and G Ciardelli,. “Advanced nanostructured materials by layer–by–layer assembly of photoactive copolymers” (2009). In: 2nd International Congress on Biohydrogels, Viareggio, Italy Oral presentation.

[C12] (a) C Tonda–Turo, C Audisio, **P Gentile**, V Chiono, S Geuna, I Perroteau, and G Ciardelli. “Natural based materials as scaffold for peripheral nerve regeneration”; (b) I Carmagnola, V Chiono, C Tonda–Turo, P Gentile, F Boccafoschi, G Georgiev, V Georgieva, and G Ciardelli. “Layer–by–Layer Coating with Photoactive Copolymers for Biomedical Applications” (2009). In: International Symposium Peripheral Nerve Repair and Regeneration and 2nd Club Brunelli Meeting, Torino, Italy Oral presentation.

[C13] **P Gentile**, G Ciardelli, V Chiono, C Vitale–Brovarone, D Massai, and E Vernè. “Hydroxyapatite/glass–ceramic/collagen composite matrices for bone tissue engineering” (2008). In: 8th World Biomaterials Congress, Amsterdam, Netherlands Poster presentation.

[C14] **P Gentile**, V Chiono, G Georgiev, F Boccafoschi, C Vitale–Brovarone, E Vernè, L Mazzucco, and G Ciardelli. “Photozymes: a powerful tool for light–controllable biomineralization into biomimetic scaffold” (2008). In: BONE– TEC congress, Hannover, Germany (Tissue Engineering, Part A (2009), 15, 29) Oral presentation.

[C15] **P Gentile**, W Cotardo, V K Nandagiri, V Chiono, C Tonda–Turo C Vitale–Brovarone, E Vernè, G Ciardelli, and F M Montevecchi. “Bioactive composite matrices for bone tissue engineering” (2008). In: NCMSTA’08 National Institute of Technology, Hamirpur, India Poster presentation.

[C16] (a) **P Gentile**, V Chiono, C Vitale–Brovarone, E Vernè, L Mazzucco, and G Ciardelli. “Biotechnical functionalisation in tissue engineering: 2. Bone Tissue”; (b) E Nieddu, L Mazzucco, T Benko, R Mandrile, **P Gentile**, and G Ciardelli. “Biodegradation of polylactide/nanoclays nanocomposite”. (2008). In: COST 868 Biotechnical functionalisation of renewable polymeric materials Meeting, Bratislava, Slovakia Rep. Oral presentation.

[C17] G Ciardelli, **P Gentile**, S Sartori, A Rechichi, G Vozzi, and V Chiono. “Biomimetic polymers through functionalisation and blending” (2008). In: 24th Annual Meeting of the Polymer Processing Society, PPS–24 Salerno, Italy Oral presentation.

[C18] **P Gentile**. “Biomimetic composite for improving biomineralization in bone tissue” (2008). In: 2° Forum nazionale dei Giovani Ricercatori su materiali Polimerici e Biomateriali, Genova, Italy Oral presentation.

[C19] (a) **P Gentile**, C Bariani, V Chiono, G Ciardelli, C Vitale–Brovarone, E Vernè, and S Mantero “Hydroxyapatite/bioactive glass/gelatin composite for bone tissue engineering; (b) V Chiono, **P Gentile**, G Georgiev, M Ninov, V Georgieva, I Pashkuleva, R L Reis, V K Nandagiri, and G Ciardelli.

“Novel amphiphilic polymers for tissue engineering applications” (2008). In: GNB – First National Congress of Bioengineering, Pisa, Italy Poster presentation.

[C20] G Ciardelli, **P Gentile**, N Barbani, V Chiono, and A Rechichi. “Enzymatically–crosslinked collagen/hydroxyapatite matrices for bone tissue regeneration” (2007). In: COST Action 868 Biotechnical Functionalisation of renewable polymeric materials Workshop Meeting, Sitges, Spain Oral presentation.

[C21] G Ciardelli, **P Gentile**, R Mandrile, V Chiono, N Barbani, M Mattioli–Belmonte, G Vozzi and P Giusti. “Biomimetic materials for tissue engineering through enzyme mediated protein modification” (2007). In: EPF European Polymer Congress, Portoroz, Slovenia Oral presentation.

[C22] G Ciardelli, **P Gentile**, R Mandrile, V Chiono, N Barbani, M Mattioli–Belmonte, G Vozzi and P Giusti. “Hydroxyapatite/collagen matrices for bone reconstruction” (2007). In: TERMIS–EU, London, UK ((Tissue Engineering, Part A, 13(7), 1708) Poster presentation

BRIEF DESCRIPTION OF RESEARCH INTERESTS AND ACCOMPLISHMENTS

My research interests are focused on **biomedical materials (polymers and composites)** and **tissue engineering**. Specifically, my research deals with **nano and micro-scale design and manufacturing of biomimetic scaffolds** for tissue engineering with an emphasis on the optimization of the chemico-physical and mechanical properties suitable for cell growth and differentiation. Main topics are:

- (i) processing of natural polymers (polysaccharides and natural proteins) to prepare films and/or porous scaffolds (*Ciardelli et al., 2010*);
- (ii) blending natural polymers (polysaccharides, such as chitosan and dextran) with synthetic polymers (polycaprolactone), synthetic polymers only (poly-lactic acid, poly-glycolic acid and polycaprolactone) and natural polymers only (chitosan and gelatin);
- (iii) physico-chemical characterization of materials and production of scaffolds by various techniques (melt and solution spinning; casting techniques; freeze-drying; deposition by pressure assisted microsyringe).

During my doctoral research program, the research was focused on the fabrication of polymeric sponge-like scaffolds or membranes through the incorporation of different bioactive agents to obtain biomimetic engineered multi-phase grafts with structure and composition similar to natural bone with the final aim to promote and direct the bone regeneration process. In order to satisfy the complex requirements of the biomimetic concept, advanced composite materials and technologies were implemented in the design and provision of appropriate biomaterials. Precisely, the bioactivity enhancement of polymeric membranes and scaffolds was attempted using two different solutions: (i) a conventional bioactive glass which is an inorganic materials stimulating biomineralisation (*Gentile et al., 2010*) and (ii) an innovative photosensitizing biopolymer (belonging to the class of photozyme polymers), chitosan-g-fluorescein (CHFL), which showed a light-switchable bioactivity. Different methods were used to prepare biomimetic membranes and porous scaffolds, such as solvent-casting, Layer-by-Layer, freeze-drying and wet-spinning.

The most significant accomplishment achieved in my doctoral research program was an innovative way to obtain bone-like apatite coating. In this research, a highly biocompatible photosensitizer, was found to be bioactive (i.e. able to activate hydroxyapatite deposition from a conventional Simulated Body Fluid solution (SBF) on the surface of the conjugate polymer film) after 7days-exposure to visible light. CHFL added to a not bioactive component, such as chitosan, at low percentages (5% w/v) also was found to promote the apatite deposition by proper irradiation of samples immersed in SBF. Then in detail the mechanisms of HA deposition was analyzed (*Chiono et al., 2010*).

The use of CHFL as a bioactive agent allowed the achievement of three important results: (i) the reduction of the incubation periods in SBF for apatite formation respect to the conventional bioactive glass; (ii) the deposition of apatite layers with Ca:P ratio close to that natural bone and (iii) the possibility to coat the inner part of pores of porous 3D scaffolds. Finally, in the last period of my doctoral research, nanostructured photoactive coatings on a crosslinked gelatin substrate were produced via Layer-by-Layer method (LbL), using photozymes as polyelectrolytes. The realized LbL coatings are innovative and may have important applications as scaffolds for bone repair: the photosensitizing properties of the cationic polyelectrolyte (CHFL) may improve the apatite crystal deposition; the anionic photozymes (an amphiphilic zwitterionic copolymer, ZI) may be exploited to increase the efficacy of sterilization by UV-exposure reducing the necessary exposure time. The successful layer-by-layer deposition of photoactive molecules (photozymes) was evidenced by an accurate physico-chemical characterization of each layer.

I am currently working as a Postdoctoral Fellow at the Department of Mechanics – Politecnico di Torino for the regional project ACTIVE (“Advanced Cardiovascular Therapies”) dealing with the realization and characterization of polymeric biomaterials for myocardial regeneration in the form of patches or injectable scaffolds. I am also involved in the realization and characterization of anti-thrombogenic polymer coatings for metallic stents, exploiting the layer-by-layer self-assembly technique.

Other main areas of research interests are:

- degradable polymers
- injectable orthopedic bone cements
- scaffolds loaded with carriers for sustained drug delivery systems
- implantable polymeric devices for tendon injuries and hernia repair.

REFERENCES

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