FEDERICA BOSCHETTI

Federica Boschetti received her master degree (M.Eng.) in Electrical Engineering in 1990 and her Ph.D. in Bioengineering in 1994 from Politecnico di Milano, Milan, Italy. She is Associate Professor of Industrial Bioengineering since April 2013 at the Department of Chemistry, Chemical Engineering and Materials of Politecnico di Milano. Before then she was Assistant Professor at the Department of Structural Engineering of Politecnico di Milano (2005-2013), Research Assistant at Politecnico di Milano (1999-2004), at the Department of Biomedical Engineering of Northwestern University (Evanston, IL, USA, 1998-1999), at S. Raffaele Hospital, Milan (1994-1998).

Most of Federica Boschetti research activity deals with experimental and computational Biomechanics. At the beginning of her carrer, her research acrtivity was mostly directed towards the cardiovascular system and life support systems: modeling and experimental studies on implantable thoracic artificial lungs, modeling studies on extracorporeal circulation during heart-lung bypass, numerical models of pathological arteries, lumped parameters models of the circulation (systemic, cerebral, coronary). Since the start of her activities at LaBS (Laboratory of Biological Structure Mechanics) in 2001, Federica Boschetti has been re-orienting her research interests towards the mechanical characterization of tissues (with particular regard to articular cartilage), through experimental in vitro tests and numerical models, and towards mechanobiology by developing microfluid-dynamics and transport models as support to the design of bioreactors for tissue growth and for the interpretation of mechanotransduction experimental results.

With regard to financial support from the Italian Ministry of University and Research (MiUR), Federica Boschetti took part in the following projects: ‘Use of mathematical models for diagnosis and cardiovascular surgery’ (1998), ‘Large Scale Computing: Molecular level instruments for biomaterial interface design’ (2000), ‘Investigation of the interaction between biological and sinthetic systems for the realization of novel biomaterials’ (2001), ‘Shape memory alloys: experimental validation of constitutive and structural models and application to novel tools in the biomedical field’ (2002), ‘Development of computational models to determine the mechanical properties of stainless steel and shape memory alloy stents, their interaction with the vessel wall and their effect with global hemodynamics’ (2003), ‘Shape memory alloys: experimental validation of constitutive and structural models and application to novel tools in the biomedical field’ (2004). Apart from the grants from MIUR, Federica Boschetti was also supported by funds from the following funding Bodies: NIH: RO1 HL 59537 (1999); Fondazione Cariplo: ‘Bone tissue engineering: research and clinics’ (2001), ‘Design of microstructured scaffolds for tissue regeneration in advanced culture systems’ (2004), ‘MicroGAP – Design, modeling and prototyping of microfluidic tools for genomics and proteomics’ (2008); FIRST: "In vitro realization of tissue engineered osteochondral composites for articular cartilage repair’ (2007).

Federica Boschetti has co-authored more than 130 scientific works, of which about 30 published in peer- reviewed international journals. She serves as a referee for many scientific journals in the field of Biomechanics (ASAIO Journal, International Journal of Artificial Organs, Journal of Biomechanics, Biotechnology and Bioengineering, Journal of Applied Biomaterials and Biomechanics, Journal of Biomedical Materials Research, Journal of the Royal Society Interface) and co-operates with national and international Research Centres.

List of selected publications:

1. Helm C-LE, Fleury ME, Zisch AH, Boschetti F, Swartz MA. SYNERGY BETWEEN 3D FLOW AND VEGF DIRECTS CAPILLARY MORPHOGENESIS IN VITRO: EXPERIMENTS AND THEORETICAL MECHANISMS. **PNAS (Proceedings of the National Academy of Sciences USA).** 2005; 102(44):15779-84.

2. Boschetti F, Raimondi MT, Migliavacca F, Dubini G. PREDICTION OF THE MICRO FLUID DYNAMIC ENVIRONMENT IMPOSED TO THREE-DIMENSIONAL ENGINEERED CELL SYSTEMS IN BIOREACTORS. **Journal of Biomechanics.** 2006; 39: 418-425.
3. Cioffi M, Boschetti F, Raimondi MT, Dubini G. Modeling evaluation of the fluid-dynamic microenvironment in tissue-engineered constructs: a micro-CT based model. ***Biotechnology and Bioengineering*** 93(3):500-510, Wiley&Sons Ltd, Hoboken, NJ (USA), 2006.
4. Boschetti F, Tomei AA, Turri S, Swartz MA, Levi M. Design, fabrication and characterization of a composite scaffold for bone tissue engineering. *The International Journal of Artificial Organs* 31(8):697-707, Wichtig, Milano, Italia, 2008.
5. Tomei AA, Boschetti F, Gervaso F, Swartz MA. 3D COLLAGEN CULTURES UNDER WELL-DEFINED DYNAMIC STRAIN: A NOVEL STRAIN DEVICE WITH A POROUS ELASTOMERIC SUPPORT.B**iotechnol.Bioeng**. 2009; 103(1):217-25. doi: 10.1002/bit.22236.
6. Scotti C, Pozzi A, Mangiavini L, Vitari F, Boschetti F, Domeneghini C, Fraschini G, Peretti GM. HEALING OF MENISCAL TISSUE BY CELLULAR FIBRIN GLUE: AN IN VIVO STUDY.**Knee Surg. Sports Traumatol. Arthrosc**. 2009;17:645-51. doi: 10.1007/s00167-009-0745-9.
7. Moriondo A, Boschetti F, Bianchin F, Lattanzio S, Marcozzi C, Negrini D. TISSUE CONTRIBUTION TO THE MECHANICAL FEATURES OF DIAPHRAGMATIC INITIAL LYMPHATICS. **J Physiol.** 2010; *588*: 3957–3969. doi: 10.1113/jphysiol.2010.196204.
8. Sosio C, Boschetti F, Mangiavini L, Scotti C, Manzotti S, Buragas MS, Biressi S, Fraschini G, Gigante A, Peretti GM. BLOOD EXPOSURE HAS A NEGATIVE EFFECT ON ENGINEERED CARTILAGE. **Knee Surg. Sports Traumatol. Arthrosc**. 2011; 19(6):1035-42. doi: 10.1007/s00167-010-1296-9.
9. De Santis G., Lennon A, Boschetti F, Verhegghe B, Verdonck P, Prendergast P. HOW CAN CELLSSENSE THE ELASTICITY OF A SUBSTRATE? AN ANALYSIS USING A CELL TENSEGRITY MODEL. **Eur. Cell. Mater***.* 2011; 22:202-13.
10. Boschetti F, Triacca V, Spinelli L, Pandolfi A. Mechanical Characterization of Porcine Corneas, J**.Biomech Eng.** 2012 Mar;134(3). doi: 10.1115/1.4006089.