

The research interests of the Laboratory of Bio-Inspired Materials (LaBIM) are focused on bioinspired materials (*Lab website:*<http://bioinspiredmaterials.jimdo.com>).

Main Research Interests:

1. Synthesis, molecular and supramolecular studies of elastomeric proteins inspired peptides from elastin, abductin, lamprin and resilin.
2. Design, production and characterization of hydrogels for skin, vascular or bone tissue engineering.
3. Design, production and characterization of electrospun multicomponent scaffolds as drug delivery systems.
4. Design, production and characterization of eco-friendly membranes as separators in lithium ion batteries.

**Gli interessi di ricerca del Laboratorio di Materiali Bio-ispirati sono focalizzati sulla sintesi chimica di materiali ispirati a biopolimeri al fine di sviluppare biomateriali innovativi e con un basso impatto ambientale.**

Linee di ricerca:

1. Sintesi, studi molecolari e supramolecolari di peptidi ispirati alle proteine elastomeriche, come l'elastina, l'adduttina, lamprina, fibroina e resilina.
2. Progettazione, produzione e caratterizzazione di idrogeli peptidici e matrici elettrofilate biodegradabile e bioattive per l'ingegneria tissutale.
3. Progettazione, produzione e caratterizzazione di matrici elettrofilate multicomponenti come sistema di rilascio controllato di molecole farmacologicamente attive.
4. Progettazione, produzione e caratterizzazione di membrane eco-compatibili come separatori di batterie agli ioni di litio.

Publications (most recent):

A. Pepe, L. Maio, A. Bracalello, L. Quintanilla-Sierra, F. J. Arias, A. Girotti, B. Bochicchio. A Soft Hydrogel Inspired by Elastomeric Proteins. *ACS Biomaterials Science & Engineering*, (2021), 7, 5028–5038.

N. Ciarfaglia, A. Laezza, L. Lods, A. Lonjon, J. Dandurand, A. Pepe, B. Bochicchio Thermal and Dynamic mechanical behavior of poly(lactic acid) (PLA) based electrospun scaffolds for tissue engineering. *Journal of Applied Polymer Science*, (2021) 138, e51313. DOI: 10.1002/app.51313.

J. Dandurand, E. Dantras, C. Lacabanne, A. Pepe, B. Bochicchio, V. Samouillan. Thermal and dielectric fingerprints of self-assembling elastin peptides derived from exon30. *AIMS Biophysics*, (2021),8, 236-247. DOI: 10.3934/biophy.2021018

B. Bochicchio, G. C. Yeo, P. Lee, A. Pepe, A. Laezza, N. Ciarfaglia, D. Quaglino, and A.S. Weiss. Domains 12 to 16 of tropoelastin promote cell attachment and spreading through interactions with glycosaminoglycan and integrins alphaV and alpha5beta1. *FEBS Journal* (2021), 288, 3875-4156. DOI: 10.1111/febs.15702

B. Bochicchio, K. Barbaro, A. De Bonis, J. V. Rau, A. Pepe. Electrospun poly(D,L-lactide)/gelatin/glass-ceramics tricomponent nanofibrous scaffold for bone tissue engineering. *Journal of Biomedical Materials Research: Part A* (2020) 108(5):1064-1076. DOI: 10.1002/jbm.a.36882.

N. Ciarfaglia, A. Pepe, G. Piccirillo, A. Laezza, R. Daum, K.Schenke-Layland, B. Bochicchio. Nanocellulose and elastin act as plasticizers of Electrospun bio-inspired scaffolds. *ACS Appl. Polym. Mater.* (2020) 2, 11, 4836–4847. DOI

A. Bracalello, V. Secchi, A. Pepe, C. Battocchio, B. Bochicchio, T. Persichini, G. Iucci, R.Mastrantonio. Fibrillar Self-Assembly of a Chimeric Elastin-Resilin. *Nanomaterials* (2019) 9, 1613; DOI:10.3390/nano9111613

G. Piccirillo, D. A. Carvajal Berrio, A. Laurita, A. Pepe, B. Bochicchio, K. Schenke-Layland, S. Hinderer. Electrospun Poly-L-lactide Scaffolds for Controlled Diclofenac Release and Non-invasive Cytotoxicity Assessment Using Multiphoton Microscopy Coupled with Fluorescence Lifetime Imaging Microscopy. *Scientific Reports*. (2019) 9, 3446. DOI: 10.1038/s41598-019-40079-7.

A. Scelsi, B. Bochicchio, A. Pepe. Labeling of Nanofiber-forming Peptides by Site-directed Bioconjugation: Effect of Spacer Length on Self-assembly. *Current Organic Synthesis* (2019) 16, 319 – 325. DOI: 10.2174/1570179416666181127150142

A. Scelsi, B. Bochicchio, A. Smith, V. L. Workman, L. A. Castillo Diaz, A. Saiani, A. Pepe. Tuning of Hydrogel Stiffness using a Two-Component Peptide System for Mammalian Cell Culture. *Journal of Biomedical Materials Research: Part A* (2019) 107, 535-544. DOI:10.1002/jbm.a.36568