



Name: Benedetta Isella

Name of the project: Development, Production and prediction of fibroin-based degradable implants

Abstract of the project: Silk fibroin is a naturally developed, sustainable material with outstanding potentialities in the field of medical devices. Silk fibroin, indeed, is not only biocompatible and biodegradable, but it presents also antiplatelet adhesion properties, tuneable mechanical and degradation characteristics and the possibility to be combined with drugs that can be then released in the physiological environment. All these characteristics make silk fibroin suitable for different clinical applications.

In particular, when used as a coating, silk fibroin can improve the osteointegration of orthopaedic and dental applications, control the degradation rate of biodegradable implants used in cardiovascular, orthopaedic and wound healing field and, in general, it can provide antibacterial effect, drug delivery and increase the biocompatibility of the implant. While the biological compatibility properties have been extensively studied, the mechanical and degradation properties need a systematic analysis in order to obtain functional coatings and devices.

For this reason, my research project is focused on the investigation of the fabrication parameters of two different technical procedures used to deposit coatings, on the identification of the adhesion strength properties and on the study of the degradation behaviour of silk fibroin processed with different methods.

Introduction of the ESR: I was born in Monza (Italy) in 1995. I obtained my Bachelor's Degree (July 2017) and my Master's (April 2020) in Biomedical Engineering at Politecnico di Milano. My Master's thesis was entitled *Implementation and calibration of a realistic computational model of a new BVS on the basis of experimental tests on device samples* and was part of the EU H2020 project InSilc. During the year spent working on my thesis my interest and my passion for the world of biomedical research arose. Indeed, I was and I still am excited about the possibility of combining experimental and computational tools in the advancement of science and engineering. After working for a short period as research assistant for NUI Galway and University College Dublin, I decided to join the Biobased Value Circle project to learn new aspects of the biomedical research and to explore the connection between university and industry.

Keywords: silk fibroin, coating, bioresorbable materials

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