

BIOENGINEERING AND MEDICAL-SURGICAL SCIENCES

DM 630/STI Lualdi - Design of medical devices for spinal and trauma applications with innovative coatings (Waiting list)

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] STI LUALDI SRL [P.iva/CF:01354660936]
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Context of the research activity	<p>The research theme is the design of new medical devices in the spinal and trauma fields characterized by antibacterial surface coatings. The focus is on the prevention of so-called "peri-implant" infections.</p> <p>Progetto finanziato dal PNRR a valere sul DM 630/2024 - CUP E14D24002350004.</p> <p>The activation of this position with scholarship is subject to the possible allocation of further funding by the MUR.</p>
Objectives	<p>The "peri-implant" infections represent a serious complication in orthopedic prosthetic surgery and require an accurate microbiological diagnosis to ensure the correct clinical management of the infectious event. At the same time, the antibacterial characteristic must not negatively affect the mechanical performance of the designed devices. The coatings will be developed in collaboration with foreign companies and universities holding intellectual property that STI can exploit thanks to exclusive partnership agreements. The devices will be designed using in-silico simulations with Finite Elements, Multibody analysis and predictive algorithms of fatigue failure already developed by the Polytechnic of Turin, in order to optimize their development and design transfer. In accordance with the objectives of the PNRR, particular attention will be paid to the creation of digital twins (digital twins) to integrate and replace in vitro and in vivo experiments with obvious positive effects on the time and costs of introduction into clinical use. In the biomedical field, these elements are crucial to allow the action of SMEs in the market,</p>

maximally controlled by multinational GIs.

**Skills and
competencies
for the
development of
the activity**

The candidate must preferably have a Biomedical Engineering background with a biomechanical and orthopedic focus in particular; must be comfortable in an uncertain, dynamic and constantly evolving context, and must be able, collaborating with the entire team, to follow the entire process of placing an orthopedic medical device on the market.