

Antonietta MESSINA

ER3, **University of Technology of Compiègne, France**

Title of postdoc project

Microencapsulation and differentiation of iPS for extracorporeal liver supply

Antonietta's background

“I have worked since 2010 on the development and characterization of bio-hybrid system for tissue engineering applications.

I completed my doctorate in January 2014 in Chemical Engineering and Materials at the University of Calabria defending my dissertation titled “Biodegradable polymeric membrane systems for tissue engineering applications”.

The advisors of my work and research were Dr. Eng. **Efrem Curcio**, Associate Professor at the Department of Environmental and Chemical Engineering of the University of Calabria, and Dr. **Loredana De Bartolo**, researcher at the Institute of Membrane Technology of the National Research Council of Italy, ITM-CNR.

I argue that **bio-hybrid membrane systems are capable of improving tissues regeneration due to their chemical-physical, morphological and mechanical properties**. Specifically, my interdisciplinary research aimed at the development and characterization of synthetic and biodegradable membranes, with selective properties, usable for building bio-artificial systems for the regeneration of neural tissue, bones and muscles.

The work performed includes the following:

- Study and selection of biomaterials for tissue engineering applications
- Preparation and characterization of polymeric membranes and scaffolds
- Setting of in-vitro bio-hybrid systems capable to foresee and improve cell response and tissue regeneration
- Biological tests and assays.

An exciting and instructive section of my doctoral research was carried out in the **USA**, at the **University of Missouri** in the laboratory of Dr. Gabor Forgacs and his team. I learned how to prepare, in a completely inert environment following the self-assembly principles, tissue spheroids of different cell lines, both differentiated and undifferentiated. By using tissue spheroids made of neural cells, Fibroblasts and Myoblasts as biological component

in bio-hybrid systems, I demonstrated that, by combining the scaffold-based and the scaffold-free tissue engineering approaches, it is possible to improve remarkably cell response and tissue maturation. The time evolution of the cell self-assembly process on inert support as model and membranes, the fusion rate of pairs of spheroids and their biological activities were investigated in order to highlight how the properties of the different substrates can influence the tissue maturation and survival.

Additionally, I worked together with other members of the ITM-CNR team on the **development of bio-hybrid membrane systems for neural, skin and liver regeneration**, and I worked with **bioreactors**, for the functional and morphological evaluation of the breast cancer cells growth.

I am coauthor of 4 international papers, book chapter, encyclopedic entries and the results of my research allowed me to participate in a few international and national congresses and conferences with oral and poster presentations.”

