HOSTING GROUPS FOR INTERNATIONAL MOBILITY

Synthesis, Preparation, and characterIzation of Novel materials (SPIN) Lab

Our research group is dedicated to the development and comprehensive characterization of **innovative, bio- and eco-compatible materials** with applications spanning **human health, environmental sustainability, and cultural heritage preservation**. Our core expertise lies in the design and fabrication of **micro- and nanocomposites, coatings, and functional films**, particularly those capable of acting as **controlled release systems** for a wide range of active agents, including drugs, fertilizers, dyes, and molecular probes.

A distinctive feature of our approach is our commitment to **circular economy principles**. Whenever feasible, we repurpose industrial and agricultural waste as raw materials, transforming them into high-value functional systems, thus combining innovation with environmental responsibility.

In parallel, we investigate the **physical-chemical behaviour of complex systems**, including biological matrices, through the development of multidisciplinary, tailored experimental protocols and advanced data analysis strategies. Our goal is to elucidate the **molecular and structural changes induced by external stimuli**, such as antibiotics, oxidative stressors, and pharmacological agents, to better understand system response and stability.

Our group actively contributes to numerous national and international research projects. Over the years, we also built robust partnerships with various institutions, including the University of Verona, University of Bologna, University of Rzeszów, University of Copenhagen, and the University of Calgary.






Team members:

Prof. Delia Francesca Chillura Martino – full professor in Physical-Chemistry

Dr. Elena Piacenza – Tenure track researcher in Physical-Chemistry

Dr. Yana Aleeva – Fixed-term type A researcher in Physical-Chemistry

Dr. Filippo Vitale – Ph.D. in Technologies and Sciences for Human Health

MSc Veronica Ciaramitaro – Ph.D. Student in Technologies and Sciences for Human Health

MSc Juana Segura Escobar – Ph.D. Student in Heritage Science

Selected publications:

- *Chitosan, alginate, and carboxymethyl cellulose-based film for a controlled release of indocyanine green for antibiofilm applications,* ***Carbohydr. Polym. Technol. Appl.****, 10, 100828 (2025), https://doi.org/10.1016/j.carpta.2025.100828*
- *Advancing SeNP synthesis: Innovative confined environments for enhanced stability and size control,* ***Mat. Chem. Today****, 38, 102115 (2024), https://doi.org/10.1016/j.mtchem.2024.102115*
- *From micro to macro: Physical-chemical characterization of wheat starch-based films modified with PEG200, sodium citrate, or citric acid,* ***Int. J. Biol. Macromol.****, 253, 127225 (2023), https://doi.org/10.1016/j.ijbiomac.2023.127225*
- *A combined physical–chemical and microbiological approach to unveil the fabrication, provenance, and state of conservation of the Kinkarakawa-gami art,* ***Sci. Rep.****, 10, 16072 (2020), https://doi.org/10.1038/s41598-020-73226-6*
- *Alcoholic nanolime dispersion obtained by the insolubilisation-precipitation method and its application for the deacidification of ancient paper,* ***Colloids Surf. A: Physicochem. Eng. Asp.****, 513, 241-249 (2017), https://doi.org/10.1016/j.colsurfa.2016.10.049*