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ΣΕΜΙΝΑΡΙΟ ΣΕΜΙΝΑΡΙΟ

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ΘΕΜΑ: **An integrative biology approach to nanomaterial effect assessment**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ITE/IEXMH

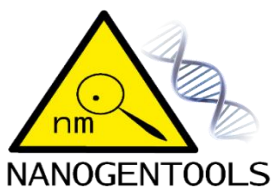
ΗΜΕΡΟΜΗΝΙΑ: **Δευτέρα, 17 Οκτωβρίου 2016**

ΩΡΑ: **12:30**

ΠΕΡΙΛΗΨΗ

The rapid increase in production and use of Engineered Nanomaterials (ENMs) is posing concerns on potential environmental hazard and risk. The production and commercial use of ENMs have been linearly increased during the last decade involving product categories such as personal care, cosmetics, fabrics and textile, household appliances, electronics and computers, health and medicine, renewable energies, etc. According to the Nanotechnology Consumer Products Inventory, currently, there are 1841 ENM-containing products in the consumer marketplace, of which 438 (24%) contain nano-silver.

Therefore, the understanding of environmental fate, ecotoxicity and mechanism of action of ENMs is a high-priority task to safeguard ecosystems but also support a safe-by-design approach for the industry. The lack of sound chronic toxicity data and prediction model to evaluate environmental concentrations of ENMs is posed with great uncertainty about their eco-safety and sustainability for human health and ecosystems.



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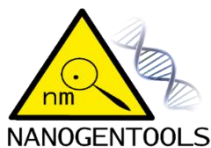


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Here we propose a framework of analysis based on integrative biology for the assessment of engineered nano-objects effects in a marine organism, the ectothermic bivalve *Mytilus galloprovincialis*, a filter-feeding mollusc with great ability to accumulate trace contaminants. Silver nanoparticles (Ag-ENP) of 5 and 50 nm with different protecting agents (paraffin based and nude) were used in either short or long-term exposure in microcosms. This approach included high and low order level effect determination, spanning from bioaccumulation, high-throughput molecular and biochemical responses, bioenergetics, life trait history and fitness prediction by the Dynamic Energy Budget model.

As a corollary, the main concerns on human health for the exposure to other class of ENMs, such as carbon nanotubes (CNTs) will be also discussed.

The seminar is organized by [Nanothinx S.A.](#), in the frame of [NanoGenTools](#), a H2020-MSCA-RISE-2015 Project, GA 691095. NANOGENTOOLS aims at developing new methodologies for the identification and control of hazards associated with nanomaterials, ensuring consumer and Society safety. It pursues the main objective of generating a common solid knowledge basis arising from the fruitful cross-sectorial synergy between forefront research Centers in nanosafety and industry, in a cross-fertilization multidisciplinary approach that will provide new tests and methodologies (or improve existing ones) to assess the long term risks of nanomaterials (NMs) in a rapid and cost effective manner suitable for regulatory inclusion. NANOGENTOOLS combines genomics (toxicogenomics), proteomics and multidisciplinary science (biophysics, molecular modelling, chemistry, bioinformatics, chemoinformatics) to develop fast in vitro high throughput (HTS) assays, with molecular based computational models for better understanding of the molecular fundamentals of nanotoxicity, and it will initiate the development of online nanosafety assays for use by SMEs during product development. The expected impacts include pre-validated tools for efficient cost-effective nanosafety assessment applicable to SMEs and suitable for incorporation into regulatory frameworks, and translation of the knowledge into a demonstration of the application of safety-by-design principles for the development of a CNT-based nanosensor.



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Dr. Dondero devoted his scientific interests to two innovative scientific research lines in applied ecology: (i) the study of alien species with regard to freshwater bivalve genomics for which he's ambassador of the Global Invertebrate Genomics Alliance; (ii) the evaluation of ecological and ecotoxicological effects of emerging pollutants such as Engineered Nanomaterials and nanoParticles (ENP). We recall, in this regard, that Dr. Dondero is currently Research Unit Head in the EU Horizon 2020 research project NANOGENTOOLS aimed to develop methods for a more accurate determination of toxicological effects of nanomaterials in either human and environmental model systems; Research Unit Head in the EUFP7 Project NANOFATE (Coordinator, Dr. Claus Svendsen, CEH, NERC, UK) for the period 2010-2014; Work Package Leader for investigation on the mechanistic effects of nano-objects in different biological model species. Member of the EU nanoSafetyCluster, an emanation of the European Commission (Directorate-General for Research and Innovation) for which he co-authored the book, Nanosafety in Europe 2015-2025: Towards Safe and Sustainable Nanomaterials and Nanotechnology Innovations, a program document containing guidelines for future research on environmental nanotoxicology within the Horizon 2020 program.

As for research line on invasive alien species, Dr. Dondero's scientific attention fell on bivalve molluscs including the huge ecological and economic damage caused by zebra mussels in Europe and US and *Limnoperna fortunei* in Latin America. To study the ecological success (adaptation, utilization of energy resources and the establishment of new trophic relationships) Dr. Dondero has been using molecular approaches to characterize mollusc transcriptomes, genomes and proteomes. To gain these studies, he joined Global Invertebrate Genomics Alliance (GIGA) the consortium and was appointed as to International Research Fellow by the Ministry of Education in Brazil for the sequencing of the Golden Mussel Genome.

Given the ability to attract funds and coordinate research activities, Dr. Dondero formed an international research group based in Europe and Brazil at the Federal University of Rio de Janeiro (Prof. M. Rebelo, co-PI). Current scientific collaborations includes several national institutions as well as the Finnish Environment Institute (Dr. Kari Lehtonen); Norsk Institutt for Vannforskning (Dr. Steven Brooks and Knut Erik Tollefsen); the University of the Basque Country Bilbao (Prof. Ibon Cancio), the UK National Environmental Research Center (Dr. Claus Svendsen and Dr. David Spurgeon); ETH Zurich (Dr. Eva. Freisinge); University of Tuebingen (Dr. Diana Maier); the Woods Hole Oceanographic Institution (USA) (Dr. John Stegeman & Jared Goldstone).

Dr. Dondero authored 74 scientific publications of which 66 in indexed international journals and 8 contributions in scientific books. He contributed as main author to more than 70 national / international meetings. Currently he has been appointed as to Scientific expert for different international funding agencies such as the National Environmental Research Center (NERC), UK; Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil; Agence nationale de la recherche (ANR), France; Research Foundation Flanders (FWO) Belgium. Dr. Dondero is an expert on innovation and former founder and scientific director from 2000 to 2010 of the biotech startup Ikzus Ricerche Mare e Ambiente, Italy.