

Panel 1: Advanced Nanotechnologies

Nanotechnology is a rapidly developing field with over 10,000 publications per year in the last decade and enormous innovation potential. To exploit this potential, however, an interdisciplinary approach should be adopted, enabling complex research and innovation issues to be addressed, including the linking of bio- and nano-sciences. The panel will, therefore, focus on selected topics of nanoscale science and technology, with a particular emphasis put on interdisciplinarity in this area. The panel will address the new trends in nanosciences and nanotechnology, including unique properties of different functional nanostructures (nanoparticles, nanocrystals, nanowires, surfaces, ultra-thin layers, multilayers) and 2D materials (graphene, TMD). Possible applications include nanophotonics (plasmons, metamaterials), nanomagnetism (spintronics, magnonics), nanoelectronics (molecular electronics, quantum devices) as well as (bio)sensors and biomedicine. The panel will also address the advances in nanomanufacturing and nanocharacterisation that are important for applications.

Panel 2: Lightweight Functional Materials

From emerging industrial technologies to advanced health care procedures, today's society depends largely on rapid access to information, transport of people and goods and sufficient supply of energy. Lightweight load bearing materials can contribute substantially to solving such challenges by providing autonomous shock protection to aerospace structures, mitigating seismic hazard, reducing vibration transmission of massive machinery, enabling lightweight tuneable protection against acoustic noise and efficient energy harvesting and storage. Unprecedented properties of the functional composites, assembled from artificial building blocks, are controlled by geometrical variables rather than chemical composition alone. The aim of the panel discussion will be, therefore, to review current state of the art fundamental knowledge, manufacturing technologies and applications and to define possible synergies in research of lightweight functional materials and their utilisation in engineering applications.

Panel 3: Digitization towards Mobility 4.0 and Industry 4.0

Automated driving and affordable electrical vehicles are key emerging technologies in the automotive industry. Automated driving is a disruptive technology, which opens the door to the future multi-billion markets, providing business opportunities to value chains in automotive and semiconductor industry. Highly automated driving systems also rise demands for the design of fail-aware (self-diagnostics), fail-safe and fail-operational (HW and SW redundancy) electronic components and systems architecture that enable the introduction of automated driving in all car categories. The panel will focus on electrical and automated vehicles technologies, including cognitive decision making, control, connectivity, propulsion, energy storage as well as research infrastructure, business-models and legal aspects. The aim of the panel discussion will be also to review possibilities of automotive technologies reuse in other domains, especially in airspace industry and highly automated production systems (Industry 4.0).

Panel 4: Research Infrastructures for Nanotechnologies and Advanced Materials

Research infrastructures play an increasingly important role today. Bringing operators and users from the micro- and nano-technologies research infrastructures together is, therefore, essential. Relevant technologies include nanofabrication such as lithography, thin film technologies, etching, micro-nano machining, and nanocharacterization, such as microscopies, spectroscopies, electrical testing, micro- and nano-mechanical testing, and metrology and micro-/nano-tomography. Besides the establishment of possible cooperation, the panel will focus on exchanging experience and developing new methodologies for the operation of research infrastructures for nanotechnologies and advanced materials. First ideas towards establishing sustainable long-term cooperation are supposed to be delivered, both in terms of the Czech-German bilateral cooperation and building the EuroNanoLab consortium towards submitting an ESFRI Roadmap 2021 update proposal in the field of nanofabrication at the European level.