



The European Materials Modelling Council

## **Nanotechnology and Advanced Materials research in H2020 and Horizon Europe (H-EU)**

### **Strategic planning, impact, governance and public engagement**

Nadja Adamovic

EMMC Chair

TU Wien, Vienna, Austria





New & improved materials are significant innovation driver in Europe

Materials modelling is a key enabler of R&D efficiency and innovation

### EMMC Mission Statement

stimulate and enhance the use of materials modelling in industry as an integral part of the R&D process

Nevertheless modelling is still not always an essential part of or critical tool in creative materials design or business decision making on product innovation

- a route to performance optimisation
- wider patent protection
- improved supply chain control
- early understanding of application performance

aiding faster and more assured market introduction





# The European Materials Modelling Council

## Future opportunities for materials modelling

**Industry 4.0**: materials innovation by modelling and multi-scale simulation tools incl. virtual design on all scales and virtual testing (digital twins), high-performance computing.

Optimisation of

- materials' production
- life-cycle assessment
- degradation and ageing processes

This should be based on standardised materials' databases and the exchange of data (use of data to develop new materials).

**Integration**: connect modelling and characterisation expertise to production facilities; combined with artificial intelligence and semantics can drive faster development of materials

**Education and training**: personnel to translate the industrial problem into modelling one and to understand the generated related data





# The European Materials Modelling Council

## Some selected EMMC research priorities...

- Materials Modelling Marketplaces (innovation hubs) and Interoperable Repositories enable more rapid innovation
- Interoperability:
  - work on semantic foundations and standardisation, i.e. build the European Materials Modelling Ontology (EMMO) and make it operable
  - drive cross boundary developments that integrate vertical industries and digital providers
  - develop and manage interfaces between different domains and systems
- Enable data exchange and data ownership and digital trust
- Establishment of an open translation environment to link materials modellers with translators and end-user industry
- To implement modelling as a standard tool for Business Decision Support System (BDSS)
- To promote knowledge-based modelling as an effective way to boost the application of Artificial Intelligence (AI) in materials development and industrial use.



