Session: Structural Integrity of Materials Processed by Additive Manufacturing Technologies

Chairmen: Amin S Azar and Spyros Diplas (SINTEF Industry)

Advances in additive manufacturing (AM) puts this key enabling technology in the limelight among other physical processing routes for producing complex shapes and multi-material components. Variations in physicochemical and mechanical properties of additively manufactured products originate mostly from surface conditions, defects, feedstock and build anisotropy. These properties affect the structural integrity and in-service performance with respect to corrosion, fracture, mechanical and wear behaviour. Additive manufacturing is often followed by post-processing such as heat treatments and hot/cold isostatic pressing, which would also influence/alter the microstructural features and subsequently the mechanical behaviour and structural integrity of the material.

The **aim** of session is to elevate the understanding of the behaviour of additively manufactured materials versus materials produced through conventional processing routes such as casting, rolling, extrusion, forging, etc. Emphasis will be given on the effect of processing and post-processing on degradation mechanisms via an understanding of the process parameters on the microstructure, surface conditions, material texture/anisotropy and mechanical/environmental behaviour. Processing simulations and (micro) structural modelling are necessary to verify the performance of AM materials and products. Abstracts may thus refer to experimental and/or modelling studies relating various aspects of processing, microstructures, properties and performance of additive manufactured materials or components.

Topics to be covered*
The session addresses the following topics:

- Modern and emerging AM processes and their effect on improved material performance.
- Breakthrough performance and applications for AM materials.
- AM processes and benchmarking of different process routes on the same material.
- New materials produced by additive manufacturing.
- New material and geometry design targeting to unique property combinations.
- Hybrid and composite materials.
- Advanced characterisation, modelling and testing of AM materials.
- In-situ, real time monitoring of AM processing.

* All material classes (metals, polymers, ceramics and composites) are included.