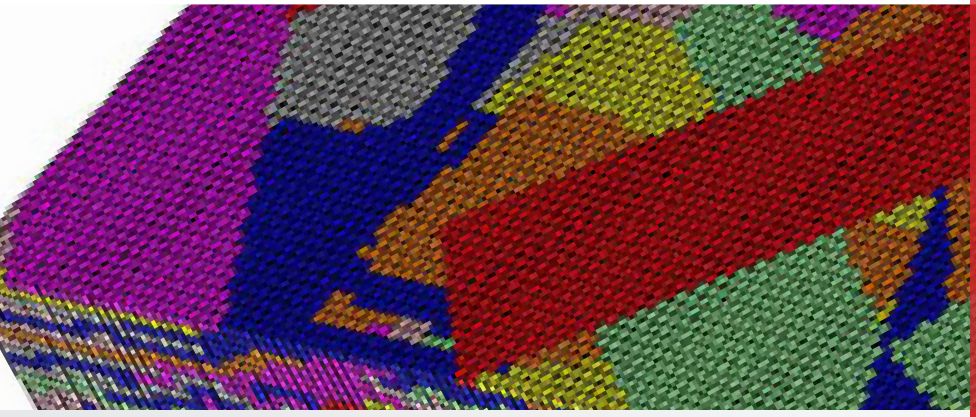

ESTREAM ENGINEERING

MSC Software Company

Material Engineering Hands-on Workshop

19 September 2017

Material Engineering is the art of understanding composites in-depth, to innovate materials based on this knowledge and to follow a micromechanical approach to describe their real performance.

Material engineering influences composites on the microscopic scale and investigates effects on the microscopic and macroscopic scales. In general a direct engineering approach is used, meaning that per-phase properties of composite constituents are given directly in combination with microstructure information and composite properties are computed on that base.

In research the approach allows to gain deep insight into materials and to systematically understand mechanisms that dominate the macroscopic material properties arising from the microscopic composition.

Based on this understanding the purpose of material engineering is to further identify promising candidates for new composite materials thereby reducing the amount of experimental effort needed. This helps to save money and to reduce the time required to develop new materials.

In industrial application the approach supports the design of composite structures by providing high quality micromechanical material models that can be used in integrative simulations to describe the performance of the part in the best way possible.

The set-up of quantitative micromechanical models typically follows a reverse engineering strategy. The constituents' parameters are varied in a characteristic physical range to match the global performance of the material as observed in anisotropic measurements.

Material experts know the characteristics of their materials best. This knowledge arises from activities that cover the:

- Measurement of anisotropic data
- Set-up & parameterization of micromechanical material models