

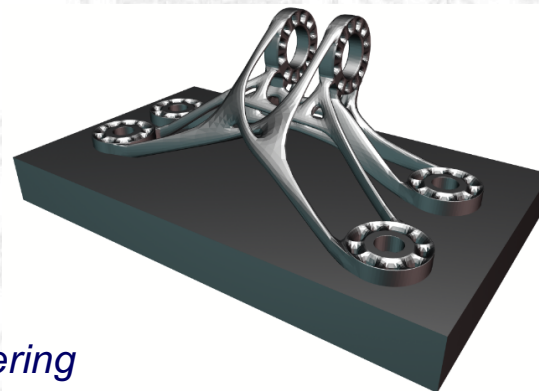


## The finite cell method and its applications to large-scale industrial simulations

The finite cell method (FCM) is an immersed finite element method that combines a fictitious domain approach with high-order finite elements. The method is suited for performing accurate FE-analysis on bodies with a complex geometry due to the use of high-order basis functions and the use of a mesh that does not need to capture the boundary of the original body. In FCM a body of complex shape is placed in a background domain with a simple shape that can be easily discretized using regular elements thus significantly simplifying the process of mesh generation.

A common feature of the finite cell method, and immersed methods in general, is the presence of cut elements i.e. elements which are intersected (cut) by the boundary of the original body. These elements require special treatment in regard to numerical integration, imposition of boundary conditions and conditioning of the linear system.

The seminar at hand will cover the basics of the finite cell method and show how this discretization method can be used within alongside *hp*-refinement and high performance computing to simulate large-scale problems of industrial relevance.



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