

# AM simulation in industry: what is preventing us from taking the next step?

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## ABSTRACT

It is not uncommon that *industrial* use of numerical simulation methods lags years behind *academic* development of new models and numerical schemes. In the field of metal additive manufacturing, however, industrial adoption of certain simulation tools was exceptionally rapid. This rapid adoption provided a market for a considerable number of new software developments and –startups. AM simulation has certain characteristics that make it eminently suited for highly automated simulation workflows (e.g. fully automated finite element meshing by voxel approximation can be sufficient for AM distortion prediction) and many of the new software tools focused on *user-friendliness* and *automation* of the simulation workflow. It seems, however, that we have reached the limits of this: highly automated approaches entail the risk of not predicting key AM defects (e.g. buckling) and with conventional Finite Element approaches, runtimes are sometimes unacceptably long for industrial use (e.g. microstructure and property prediction for an industrial part).

Based on exchanges with many *industrial* end-users of AM simulation methods, this lecture will illustrate current simulation practice *in industry*, and highlight issues that currently prevent us from taking the next step. The goal is to spark creative dialogue between industrial end-users, researchers and method / tool developers, in order to make more widespread and more advanced use of simulation in industry a possibility.