**Abstract:**

Any real material is subject to damage as for which crucial mechanical properties such as stiffness or load-carrying capacity change. Since damage itself cannot be measured in situ by non-destructive tests but only indirectly through the effect it has on the macroscopic material properties, this scenario leads to an inverse problem.

Starting with some fundamental aspects of damage modeling, this talk will introduce an approach to identify the damage supply in a dynamic mechanical model incorporating damage evolution based on the ideas of Kachanov and Rabotnov. Different mechanical settings (dynamic or quasi-static), different damage approaches (gradient of damage or phase field models), and some possible applications will be discussed, too.