

# Lecture "Artificial Intelligence and High-Performance Data Mining for Accelerating Scientific Discovery"

*Wednesday, 15 September 2021 17:45 (1 hour)*

The increasing availability of data from the first three paradigms of science (experiments, theory, and simulations), along with advances in artificial intelligence and machine learning (AI/ML) techniques has offered unprecedented opportunities for data-driven science and discovery, which is the fourth paradigm of science. Within the arena of AI/ML, deep learning (DL) has emerged as a game-changing technique in recent years with its ability to effectively work on raw big data, bypassing the (otherwise crucial) manual feature engineering step traditionally required for building accurate ML models, thus enabling numerous real-world applications, such as autonomous driving. In this talk, I will present our ongoing research in AI and high performance data mining, along with illustrative real-world scientific applications. In particular, we will discuss approaches to gainfully apply DL on big data (by accelerating DL and enabling deeper learning) as well as on small data (deep transfer learning) in the context of materials science. I will also demonstrate some of the software tools developed in our group.

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**Session Classification:** Learning from Complex Data