



Friedrich-Alexander-Universität
Research Center for
Mathematics of Data | MoD

FAU MoD Lecture Series



AI Components in PDE Solvers

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#FAUMoDLecture

WHEN

Monday, **November 10, 2025**
17:00H (Berlin time)

WHERE

On-site / Online

Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU)
Room **H12 Emmy-Noether-
Hörsaal**. Felix-Klein building
Cauerstraße 11, 91058
Erlangen. Bavaria, Germany

Live-streaming:

<https://www.fau.tv/clip/id/59621>

In this lecture, I will talk about recent advancements from the area of AI and deep learning for physics simulations. A key focus is the utilization of numerical solvers capable of providing gradient information, i.e. "differentiable simulators". These solvers seamlessly integrate with deep learning algorithms, presenting numerous advantages in arising from AI-based components in solvers, particularly in the context of flow simulations. However, the availability of gradient computation is not ubiquitous in many existing fluid simulation environments. Consequently, I will demonstrate a strategic approach to leverage non-differentiable simulators, serving as an interesting transitional step and a middle ground in this context. The resulting, trained neural networks provide flexible computational components in physics solvers for varied applications such as closure modeling, accelerated solving and inverse problems.