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

FAU MoD Lecture Series

Data Driven Modeling for Scientific Discovery and Digital Twins

Dongbin Xiu

THE OHIO STATE UNIVERSITY

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WHEN

Monday **April 20, 2026**
11:00H (Berlin time)

WHERE

On-site / Online

Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU).
Room **H13 Johann-Radon-Hörsaal**
Felix-Klein building
Cauerstraße 11, 91058
Erlangen. Bavaria, Germany

Live-streaming:
https://www.fau.tv/clip/id/59621

We present a data-driven modeling framework for scientific discovery, termed Flow Map Learning (FML). This framework enables the construction of accurate predictive models for complex systems that are not amenable to traditional modeling approaches. By leveraging data and the expressiveness of deep neural networks (DNNs), FML facilitates long-term system modeling and prediction even when governing equations are unavailable. FML is particularly powerful in the context of Digital Twins, an emerging concept in digital transformation. With sufficient offline learning, FML enables the construction of simulation models for key quantities of interest (QoIs) in complex Digital Twins, when direct mathematical modeling of the QoIs is infeasible. During the online execution of a Digital Twin, the learned FML model can simulate the QoIs without reverting to the computationally intensive Digital Twin simulation model. As a result, FML serves as an enabling methodology for real-time control and optimization for complex systems.