BRIN MATHEMATICS RESEARCH CENTER

UNIVERSITY OF MARYLAND 18 56

Brin MRC Distinguished Lecture

Predictive Science and Deep Learning: A Bright Future or an Odd Couple?

Wolfgang Dahmen, University of South Carolina/RWTH Aachen

Date: September 20, 2023
Time: 3:15 PM
Location: 3206 Kirwan Hall

Abstract

Modern machine learning methodologies appear to exert a transformative impact on society and science, especially in "Big Data" application scenarios.

While these applications are typically error-tolerant this talk focuses on a rigorous accuracy quantification when trying to use machine learning tools to recover "physical states of interest" from several sources of incomplete information, e.g. in terms of observational data and governing possibly deficient physical laws.

We highlight intrinsic challenges and discuss conceptual pathways exploiting the role of stable variational formulations of the governing PDEs as well as tailored optimization strategies for training on variationally correct residual loss functions.

About the Speaker

Wolfgang Dahmen received his PhD from RWTH Aachen in 1976 and his Habilitation from the University of Bonn in 1981. After professor positions at the University of Bielefeld, the Free University of Berlin, and RWTH Aachen in Germany he held the SmartState and the Williams-Hedberg Chair in Mathematics at the University of South Carolina.

Dahmen has recognized research contributions to approximation theory, numerical analysis, computational harmonic analysis. Central themes are adaptive solution concepts, high-dimensional approximation, and certifiable model reduction.

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