



Frontiers of Mathematics Lecture

Mathematics and AI

Abstract

Though deep learning-based AI has made tremendous progress, its mathematical foundation remains poorly understood by the general mathematical and AI communities. The lack of such understanding has pushed AI into an experience-based, trial and error state of development.

In this talk, we will take a mathematical perspective on AI and deep learning. We will see that deep learning is very much a clean and deep mathematical problem, but with additional complexities not dealt with before in the mathematics literature. These complexities include high dimensionality, non-locality and hidden spaces. We will discuss how different AI techniques overcome these difficulties, and the mathematics behind these issues.



Professor Weinan E
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Biography

Weinan E is a professor in the Center for Machine Learning Research (CMLR) and the School of Mathematical Sciences at Peking University. He was also the inaugural director of the AI for Science Institute in Beijing. He is a member of the Chinese Academy of Sciences; a fellow of SIAM, AMS, IOP, CSIAM ORSC, and CCF.

His main research interest is numerical algorithms, machine learning and multi-scale modeling, with applications to chemistry, material sciences and fluid mechanics. He was a plenary speaker at the 2022 International Congress of Mathematicians (ICM), a keynote speaker at the 2022 International Conference on Machine Learning (ICML) and an invited speaker at ICM2002 and ICIAM (International Congress of Industrial and Applied Mathematics) 2007. He has also been invited speaker at leading conferences in many other scientific disciplines, including the APS, ACS, AIChE annual meetings, the American Conference of Theoretical Chemistry and the World Congress of Computational Mechanics.

He was awarded the ICIAM Collatz Prize in 2003, the SIAM Kleinman Prize in 2009 and the SIAM von Karman Prize in 2014, the SIAM-ETH Peter Henrici Prize in 2019, the ACM Gordon-Bell Prize in 2020, the ICIAM Maxwell Prize in 2023, and the ICIAM Su Buqing Prize in 2024, the inaugural ICCM Lin Prize and the Ho Leung Ho Lee Foundation Prize for Scientific and Technological Progress in 2025.

Date :
June 11, 2026 (Thursday)

Time :
5:00 – 6:00 pm

Venue :
Lecture Theatre A, 1/F,
Chow Yei Ching Building,
The University of Hong Kong

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