

Thursday • January 5, 2023 • 5 PM–6PM
Hynes Convention Center, Ballroom AB

The Mathematics of Deep Learning

Over the past decade, deep (neural) networks trained using massive data sets have enabled remarkable progress on a wide range of challenging computational problems, from pattern recognition and image synthesis to language translation and protein folding. Nevertheless, this progress has been alchemistic and driven largely by empirical observations, hacks, and tricks. This talk will overview some of the recent advances made by the mathematics community towards a theory of deep learning based on rigorous mathematical principles. Such a theory aims to provide insights into deep networks' successes and shortcomings, a principled route to their improvement, and new avenues for exploration. Of the several promising avenues of research, we will focus on the connection between deep networks and spline approximation that provides a geometric interpretation for how deep networks organize and process data.



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The AMS Council established the Josiah Willard Gibbs Lectureship in 1923, making it one of the Society's oldest and most prestigious lectures. Gibbs (b. 1839 –d. 1903), a mathematical physicist, was one of the greatest scientists America has ever produced. This invited lecture is popular in nature, directed at those who are not professional mathematicians and intended to make the public aware of the contribution that mathematics is making to present-day thinking and modern civilization.

