

Department of Applied and Computational Mathematics and Statistics Colloquium



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Solving the Schrödinger Equation by a Parameterized Wasserstein Hamiltonian Flow

I will present a reformulation of the Schrödinger equation using a generative model and an associated computational method to solve it in higher dimensions. The new expression is obtained by using the Madelung transform and a pushforward mechanism on the Wasserstein manifold, the probability density space equipped with the optimal transport metric. The approach leverages optimal transport theory and Machine Learning techniques, such as generative models, resulting in a system of ODEs for the neural network parameters. The method is a meshless, basisless, sample-based scheme that is capable of scaling up to higher-dimensional problems. The strategy can be applied to other Wasserstein Hamiltonian flows. This presentation is based on joint work with Shu Liu (Florida State), Hao Wu (Hong Kong Polytechnic), and Xiaojing Ye (Georgia State).

Friday, Oct. 16, 2026

3:30 – 4:30 PM

117 Hayes-Healy Center

Colloquium Tea – 3:15 PM in 117 Hayes-Healy