# SEMINARIO

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## *Computational mathematics, nonlinear evolutionary PDEs, and applications in fluid mechanics and fluid dynamics in porous media*

**Abstract:** Nonlinear evolutionary PDEs modeling first-order hyperbolic-transport models are relevant on the mathematical foundations in several engineering problems and applied sciences in fluid mechanics and fluid dynamics in porous media. In this talk, we will discuss how new insights on the improved concepts no-flow curves and no-flow surfaces in a Lagragian-Eulereian formulation are key ingredients to address inherent solution properties of hyperbolic-transport models: nonlinearity, wave-breaking phenomena (discontinuous solutions) and unique weak-entropy (shock) solutions. We will also present some recent advances in the design of a new class of semi-discrete positive Lagrangian-Eulerian schemes for solving multidimensional systems of hyperbolic-transport problems supported by rigorous analysis. Numerical experiments in agreement with the numerical analysis will be presented to illustrate the performance of our approach for scalar equations and systems in 1D and 2D.

**Sala de Grados I, Facultad de Ciencias**
**Martes 12 de Septiembre de 2023 (17:00)**
**Organiza: GIR MTANPOEE**

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