Oklahoma State University

Colloquium

Title

On the Mathematical Properties of Some Multi-Scale Traffic Models

Speaker:	Xiaoqian Gong, Arizona State University
Date:	Jan 31, 2023
Time:	3:30 PM
Room:	Virtual

Abstract: In this talk, we will present the mathematical properties of some microscopic, mesoscopic and macroscopic descriptions of traffic flow models. From the microscopic perspective, we will discuss the limitations and improvements of the Intelligent Driver Model (IDM), as well as the well-posedness of the "Bando-Follow-the-Leader" (Bando-FtL) Model and a time-delayed version of the Bando-FtL. As one of the applications of the microscopic car-following models, we will talk about optimal cruise control for traffic smoothing. From the mesoscopic perspective, we will derive rigorously the mean-field limit of a finite-dimensional hybrid system describing multi-lane and multi-class traffic flow in presence of human-driven and autonomous vehicles. From the mesoscopic perspective, we will briefly talk about the well-posedness of a non-local LWR model with memory. Numerical simulations and field experiment results will also be presented.