COLLOQUIUM

DEPARTMENT OF MATHEMATICS AND STATISTICS
OAKLAND UNIVERSITY
ROCHESTER, MICHIGAN 48309

Rosangela Svieroski
Department of Mathematics and Statistics
Oakland University

The Problem of Multiple Scale Applied to the Coupled System of Water Flux and Heat Exchanges near the Soil Subsurface

Abstract

Models that predict the simultaneous movement of liquid water, vapor and heat in the shallow subsurface has many practical interests, given the critical role these processes play in the global water and energy balances. Given the limitation in computational capabilities, important details describing the interaction between heat and water near the subsurface, including the soil and its spatial heterogeneity, are big challenges to be accounted for in current global climate models.

In this talk, I will present a mathematical homogenization procedure that applies the two-scale formulation and asymptotic analysis into elliptic operators, and in particular, into the non-linear coupled system that describes the interaction between water and heat near the soil surface. The resulting 3D-upscaled (homogenized) model uses parameters such as air temperature, solar radiation, among others, as boundary conditions, making it more realistic and ready for coupling with the atmosphere. The use of such upscaled model allows a more accurate prediction of evaporation and water's budget that can be used into large-scale climate modeling efforts to better quantify the change of the climate, its forecast and its impact.

Within the talk, I will point to problems that I would like to pursue further research and collaboration with colleagues from the department. Since multiple scale has a wide range of applications, I hope to be seek possibility for research and interaction in other areas, besides porous media.

Tuesday, Sept 24, 2019
12:00 – 12:50 P.M.
372 Mathematics and Science Center (MSC)

(Refreshments at 11:30-12:00 PM in the kitchen area adjacent to 368 MSC)