

Mathematics Department Colloquium

Organizer(s): Kenneth Ribet

Thursday, 4:10–5:00pm, 60 Evans

Mar. 5 **Grigory Isaakovich Barenblatt**, UC Berkeley
Tropical Hurricanes, Dust Storms, Firestorms; facts, logic, mathematical model

A mathematical model of these phenomena based on the idea of A.N. Kolmogorov concerning turbulent flow laminarization by suspended heavy particles will be presented. Previously the theory, quantified by the present speaker, used the assumption that the suspended heavy particles were identical. It was applied (A. J. Chorin, V. M. Prostokishin and present speaker) to the tropical hurricanes (Sir James Lighthill's model of the "oceanic spray" was a substantial part of this study), as well as to terrestrial and Martian dust storms (G. S. Golitsyn and present speaker).

Recently the model was modified by assuming that there are two sorts of particles in the flow (water droplets, dust, or debris and soot particles): small and large (it will be defined in what sense). The modification allowed to obtain a much larger flow acceleration which seems to be more realistic. I will also address the question of how the hurricanes can be controlled. The proposed model is based on a modern version of the turbulent shear flow theory developed by A. N. Kolmogorov (1942) and L. Prandtl (1945). No preliminary knowledge of turbulence is assumed; everything needed for understanding the lecture will be presented on the spot.