Center for Scientific Computation And Mathematical Modeling

CSCAMM

University of Maryland, College Park

A Program Announcement

"Analytical and Computational Challenges of Incompressible Flows at High Reynolds Number"

October 23-26, 2006

Organizing Committee: Peter Constantin, Thomas Hou, Jian-Guo Liu, Eitan Tadmor

SCIENTIFIC BACKGROUND

High Reynolds number flow is a classical research theme that retains its vitality at several levels, from real-world applications, through physical and computational modeling, up to rigorous mathematical analysis. There are two reasons for the continued relevance of this topic. The first is the ubiquity of such flows in situations of practical interest, such as blood flow in large caliber vessels, fluid-structure interaction, aerodynamics, geophysical and astrophysical flow modeling. The second issue is that, despite of half a century of vigorous efforts, there is still a lack of systematic understanding how different scales interact to form the inertial range from a smooth initial condition. The description of the behavior of solutions of the Navier-Stokes equations at high Reynolds number is at the heart of the problem, and surprisingly, mathematical analysis seems to be a promising route for gaining insight. Is singularity formation of incompressible flows at high Reynolds number necessary for the formation of the inertial range in a turbulent flow? or is the dynamical generation of extremely small but finite scales sufficient for this purpose? The choice of the singularity problem for the incompressible Navier-Stokes equation as one of the seven Millennium prize problems highlights the fundamental role that mathematical analysis may yet play in this subject, while attesting to the quality of the mathematical challenge posed by problems in this area.
This is the second CSCAMM workshop on this topic, following our Spring 2004 meeting.

GOALS

To examine the ongoing research on the mathematical analysis of incompressible flows; to identify promising avenues of research; to formulate a number of problems that are at once tractable and have potential to provide further insight into the nature of high Reynolds number flows.

A limited number of opening are available.

To apply please RSVP at:
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Additional information is posted at:
www.cscamm.umd.edu/programs/inc06
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INVITED PARTICIPANTS

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CSCAMM is part of the College of Computer, Mathematical and Physical Sciences

UNIVERSITY OF MARYLAND

A limited amount of funding for participants is available, especially for researchers in the early stages of their career who want to attend the full program.