

Η Επιτροπή Σεμιναρίων της Σχολής Χημικών Μηχανικών έχει την ευχαρίστηση να σας προσκαλέσει σε σεμινάριο της Σχολής, που θα δοθεί από τον Αναπληρωτή Καθηγητή κο Παναγιώτη Δημητρακόπουλο, Department of Chemical Engineering, University of Maryland των Η.Π.Α.

Το σεμινάριο έχει προγραμματιστεί για την Τρίτη, 8 Ιουλίου 2008 στις 13:30, στην Αίθουσα Πολυμέσων (Κτήριο Βιβλιοθήκης). Ο τίτλος της διάλεξης του κυρίου Δημητρακόπουλου είναι "Dynamics of Capsules and Erythrocytes in Strong Viscous Flows"

"DYNAMICS OF CAPSULES AND ERYTHROCYTES IN STRONG VISCOUS FLOWS"

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The study of the interfacial dynamics of capsules and erythrocytes in viscous flows has seen an increased interest during the last few decades due to their numerous engineering and biomedical applications. Artificial capsules have wide applications in the pharmaceutical, food and cosmetic industries while the motion of red blood cells through vascular microvessels has long been recognized as a fundamental problem in physiology and biomechanics owing to oxygen delivery to tissues. However, current understanding of the dynamics of capsules and erythrocytes at high flow rates is limited owing to the coupling of the fluid dynamics with the membrane elastic-solid properties.

Based on computational investigation via our interfacial spectral boundary element algorithm, we have identified and explained the dynamics of strain-softening and strain-hardening capsules in strong extensional flows including the appearance of spindled and cusped steady-state edges and their bifurcation. The dynamics of erythrocytes is more complicated owing to their multi-layered membrane which is composed by an area-incompressible lipid bilayer underlined by a thin elastic cytoskeleton which exhibits resistance to shearing deformation. Our computational results for the cell deformation and tank-treading frequency in shear flows are in excellent agreement with experimental findings from ektacytometry. Most importantly, our computational work allows analysis of the erythrocyte dynamics beyond the capabilities of ektacytometry and other experimental techniques which see the cell from one view-angle only. In this talk I will discuss the swinging motion of the erythrocytes observed (for the first time) at high shear rates and how it is affected by the flow rate and the viscosity ratio. The transition of the erythrocyte motion from tank-treading to tumbling with increasing viscosity ratio will also be elucidated.

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Με θερμούς συναδελφικούς χαιρετισμούς.

Η Επιτροπή Σεμιναρίων ΣΧΜ

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