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Donald P. Gaver

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New Orleans, LA 70118

Education

California Institute of Technology, Pasadena, CA. B.S. 1982 Applied Physics
Occidental College, Eagle Rock, CA. B.A. 1982 Physics
Northwestern University, Evanston, IL. M.S. 1985 Theoretical and Applied Mechanics
Northwestern University, Evanston, IL. Ph.D. 1988 Theoretical and Applied Mechanics

Research Interests

My laboratory aims to develop an understanding of the interrelationships between the mechanical and physicochemical behavior of biological systems. The main thrust of this research involves investigations of the pulmonary system. It is my intent to use this understanding to help, either directly or indirectly, the development of improved therapies for pulmonary disease. At present, this research focuses on investigations of interfacial phenomena and transport processes relevant to pulmonary disorders. These investigations require the study of surface-tension-gradient-driven (Marangoni) convection, capillarity, physicochemical hydrodynamics, viscous flows, fluid/flexible-boundary interactions and convection-diffusion transport. In addition, I have developed a recent interest in environmental research related to the influence of mechanical stress on cells. These studies focus on identifying the fluid stress field exerted on adherent cells, which may have an impact on mechanotransduction, cell adhesion or bacterial migration through porous media.

Honors and Awards

National Young Investigator Award (National Science Foundation) (1993-1998)
Member, College of Fellows, American Institute for Medical and Biological Engineering
Provost's Award for Research and Scholarly Excellence (2005)
Teacher of the Year, Department of Biomedical Engineering, Tulane University (1992, 2005, 2007, 2008)

Selected Publications

Gaver, D.P., III, D. Halpern, O.E. Jensen, and J.B. Grotberg. The steady motion of a semi-infinite bubble through a flexible-walled channel. *J. Fluid Mech.*, 319: 25-65, 1996.

Ghadiali, S. N. and D. P. Gaver. Investigation of pulmonary surfactant physicochemical behavior under airway reopening conditions. *Journal of Applied Physiology*, 88: 493-506, 2000.

Ghadiali, S.N. and D. P. Gaver III, The influence of non-equilibrium surfactant dynamics on the flow of a semi-infinite bubble in a rigid cylindrical tube. *J. Fluid Mech.*, 478: 165-196, 2003.

Bilek, A.M., K.C. Dee and D. P. Gaver, Mechanisms of surface-tension-induced epithelial cell damage in a model of pulmonary airway reopening. *Journal of Applied Physiology*, 94: 770-783, 2003.

Jacob, A.M. and D. P. Gaver III, An investigation of the influence of cell topography on epithelial mechanical stresses during pulmonary airway reopening. *Physics of Fluids*, 17: 031502 (11 pages), 2005.

Zimmer IV, M.E., H.A.R. Williams and D. P. Gaver III, The transport of an inactive surface-associated contaminant during the pulsatile motion of a semi-infinite bubble in a channel. *J. Fluid Mech.*, 537: 1-33, 2005.

Smith, B.J. and D. P. Gaver III, The pulsatile propagation of a finger of air through a fluid-occluded cylindrical tube. *J. Fluid Mech.*, 601: 1-23, 2008.

Pillert, J. E. and D. P. Gaver III. Physicochemical effects enhance surfactant transport in pulsatile motion of a semi-infinite bubble. *Biophysical Journal*, in press.

Ghadiali, S.N. and Gaver, D.P. Biomechanics of liquid-epithelium interactions in pulmonary airways. *Respiratory Physiology & Neurobiology*, 163(1-3):232-243, 2008.

Williams, Fauci and Gaver: Evaluation of interfacial fluid dynamic stresses using the immersed boundary method. *Discrete and Continuous Dynamical Systems*, in press.

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