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CFD Simulations of transport of magnetic nanoparticles in BioMEMS

Ramesh K Agarwal

Washington University in St. Louis, USA

Microfluidic devices employing magnetic nanoparticles can serve as a useful platform for understanding and developing diagnostic and therapeutic instruments and techniques for medical applications. Magnetic particles based sensors have many advantages over the standard laboratory based diagnostic protocols. The focus of this paper is to study the transport of magnetic particles in microfluidic devices by numerical simulations. Numerical simulations of transport of magnetic particles and their interaction with the fluid in the presence of a magnetic field are conducted in microfluidic devices by solving the governing equations of fluid dynamics and electrostatics. These studies are of relevance in development of bioMEMS for Magnetic Drug Targeting (MDT) applications.

Biography

Ramesh K Agarwal is the William Palm Professor of Engineering and the Director of Aerospace Research and Education Center at Washington University in St. Louis. From 1994 to 2001, he was the Sam Bloomfield Distinguished Professor and Executive Director of the National Institute for Aviation Research at Wichita State University in Kansas. From 1978 to 1994, he worked in various scientific and managerial positions at McDonnell Douglas Research Laboratories in St. Louis. He became the Program Director and McDonnell Douglas Fellow in 1990. He received PhD in Aeronautical Sciences from Stanford University in 1975, MS in Aeronautical Engineering from the University of Minnesota in 1969 and BS in Mechanical Engineering from Indian Institute of Technology, Kharagpur, India in 1968. He is the author and coauthor of over 400 publications and serves on the editorial board of 20+ journals. He has given many plenary, keynote and invited lectures at various national and international conferences worldwide. He is a Fellow of sixteen societies including the Institute of Electrical and Electronics Engineers (IEEE), American Association for Advancement of Science (AAAS), American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), American Society of Mechanical Engineers (ASME), Royal Aeronautical Society and American society for Engineering Education (ASEE). He has received many prestigious honors and national/international awards from various professional societies and organizations for his research contributions.

agarwalr@seas.wustl.edu