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Education

B.A., Mathematics, University of Cambridge, 1974.

Mathematics Tripos Part III, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, 1975. M. Math degree awarded April, 2011.

M.A., University of Cambridge, 1977.

Ph.D., Department of Applied Mathematics and Theoretical Physics, University of Cambridge, 1979. Thesis: *Aspects of unsteady turbulent shear flow, turbulent diffusion and tidal dispersion.*

Appointments

Pre-doctoral Research Fellow, Woods Hole Oceanographic Institute, Geophysical Fluid Dynamics Summer Program, July-August 1977.

Post-doctoral Research Fellow, Department of Mechanics and Material Science, The Johns Hopkins University, Baltimore, 1979-1980.

Lecturer and Post-doctoral Research Fellow, Department of Chemical Engineering, The Johns Hopkins University, Baltimore, 1980-1981.

Lecturer and Visiting Associate Research Scientist, Department of Chemical Engineering, The Johns Hopkins University, Baltimore, 1981-1982.

Assistant Professor, Division of Applied Mathematics, Brown University, Providence, September 1982 - June 1987.

Associate Professor, Division of Applied Mathematics, Brown University, Providence, July 1987 - December 1987.

Associate Professor of Applied Mathematics and Engineering, Brown University, Providence, January 1988 - June 1992.

Professor of Applied Mathematics and Engineering, Brown University, Providence, July 1992 to present.

Director, Center for Fluid Mechanics, Turbulence and Computation, July, 1991 to present.

Completed Publications

Chapters in books

J.C.R. Hunt and M.R. Maxey, 1978. Estimating velocities and shear stress in turbulent flows of liquid metals driven by low frequency electromagnetic fields, Proceedings of the 2nd Bat-Sheva Intl. Seminar on MHD Flows and Turbulence, (eds. H. Branover and A. Yakhot) Israel Universities Press, 249-269.

L. Sirovich, M.R. Maxey and H. Tarman, 1988. An eigenfunction analysis of turbulent thermal convection. Proceedings of the Sixth Symposium on Turbulent Shear Flows, (ed. B.E. Launder) Springer Verlag, 68-77.

M.R. Maxey and E.J. Chang, 1996. Direct simulations of microbubble dynamics and turbulent flow. Proceedings of the 3rd International Symposium on Engineering Turbulence Modelling and Measurements, (eds. W. Rodi and G. Bergeles) Elsevier, 273-278.

J. Xu, S. Dong, M. Maxey and G. Karniadakis, 2003. Direct numerical simulation of turbulent channel flow with bubbles. Current Trends in Scientific Computing: ICM2002-Beijing Satellite Conference on Scientific Computing, August 15-18, 2002, Xi'an Jiaotong University, Xi'an, China, (eds. Z. Chen, R. Glowinski, and K. Li). Contemporary Mathematics (Am. Math. Soc, Providence, R.I.) v. **329**, 347-354.

M. R. Maxey, D. Liu, S. Dong, G. E. Karniadakis, 2006. New Advances in Force-Coupling Method: from micro to macro. Proceedings of IUTAM Symposium on Computational Approaches to Disperse Multiphase Flow, S. Balachandar and A. Prosperetti (eds), pp. 237-246, Springer.

E. Climent and M.R. Maxey, 2008. The Force Coupling Method: A flexible approach for the simulation of particulate flows. "Methods for creeping flows", edited by F. Feuillebois and A. Sellier, Ressign Press.

Refereed journal articles

J.F. Keffer, J.G. Kawall, J.C.R. Hunt and M.R. Maxey, 1978. Uniform distortion of thermal velocity mixing layers. J. Fluid Mech. **86**, 465-490.

M.R. Maxey, 1981. Distortion of turbulence in flows with parallel streamlines. *J. Fluid Mech.* **124**, 261-282.

M.R. Maxey and J.J. Riley, 1983. Equation of motion for a small rigid sphere in a nonuniform flow. *Phys. Fluids* **26**, 883-889.

B.D. Marsh and M.R. Maxey, 1985. On the distribution and separation of crystals in convecting magma. *J. Volcanology and Geothermal Res.* **24**, 95-150.

M.D. Walker and M.R. Maxey, 1985. A whirling hot-wire anemometer with optical data transmission. *J. Phys. E: Sci. Instrum.* **18**, 516-521.

M.R. Maxey and S. Corrsin, 1986. Gravitational settling of aerosol particles in randomly oriented cellular flow fields. *J. Atmos. Sci.* **43**, 112-1134.

M.R. Maxey, 1987. The gravitational settling of aerosol particles in homogeneous turbulence and random flow fields. *J. Fluid Mech.* **174**, 441-465.

M.R. Maxey, 1987. The velocity skewness measured in grid turbulence. *Phys. Fluids* **30**, 935-938.

M.R. Maxey, 1987. The motion of small spherical particles in a cellular flow field. *Phys. Fluids* **30**, 1915-1928.

S. Balachandar and M.R. Maxey, 1989. Methods for evaluating fluid velocities in spectral simulations of turbulence. *J. Comput. Phys.* **83**, 96-125.

L. Sirovich, S. Balachandar and M.R. Maxey, 1989. Simulations of turbulent thermal convection. *Phys. Fluids A* **1**, 1911-1914.

S. Balachandar, M.R. Maxey and L. Sirovich, 1989. Numerical simulations of high Rayleigh number convection. *J. Scientific Computing* **4**, 219-236 (1989).

M.R. Maxey, 1990. On the advection of spherical and nonspherical particles in a nonuniform flow. *Phil. Trans. R. Soc. (London) A* **333**, 289-307.

H. Shin and M.R. Maxey, 1991. Chaotic sedimentation of spheroidal particles in a cellular flow field. (IUTAM Symposium on the Fluid Mechanics of Stirring and Mixing, La Jolla, August 1990) *Phys. Fluids A* **3**, 1434.

R. Mallier and M.R. Maxey, 1991. The settling of nonspherical particles in a cellular flow field. *Phys. Fluids A* **3**, 1481-1494.

G. Ruetsch and M.R. Maxey, 1991. Small-scale feature of vorticity and passive scalar fields in homogeneous isotropic turbulence. *Phys. Fluids A* **3**, 1587-1597.

- L-P. Wang, M.R. Maxey, T.D. Burton and D.E. Stock, 1992. Chaotic dynamics of particle dispersion in fluids. *Phys. Fluids A* **4**, 1789-1804.
- G.R. Ruetsch and M.R. Maxey, 1992. The evolution of small-scale structures in homogeneous isotropic turbulence. *Phys. Fluids A* **4**, 2747-2766.
- L-P. Wang and M.R. Maxey, 1993. The motion of microbubbles in a forced isotropic and homogeneous turbulence. *Applied Scientific Res.* **51**, 291-296.
- L-P. Wang and M.R. Maxey, 1993. Settling velocity and concentration distribution of heavy particles in homogeneous, isotropic turbulence. *J. Fluid Mech.* **256**, 27-68.
- M.R. Maxey, E.J. Chang and L-P. Wang, 1994. Simulation of interactions between microbubbles and turbulent flows. *Applied Mech. Rev.* **47**(6), S70-S74.
- E.J. Chang and M.R. Maxey, 1994. Accelerated motion of rigid spheres in unsteady flow at low to moderate Reynolds number. Part I - Oscillatory motion. *J. Fluid Mech.* **277**, 347-379.
- E.J. Chang and M.R. Maxey, 1995. Accelerated motion of rigid spheres in unsteady flow at low to moderate Reynolds number. Part II - Accelerated motion. *J. Fluid Mech.* **303**, 133-153.
- J. Rubin, C.K.R.T. Jones and M.R. Maxey, 1995. Settling and asymptotic motion of aerosol particles in a cellular flow field. *J. of Nonlinear Sci.* **5**, 337-358.
- M.R. Maxey, E.J. Chang and L-P. Wang, 1996. Interactions of particles and microbubbles with turbulence. *Experimental Thermal and Fluid Science* **12**, 417-425.
- M.R. Maxey, B.K. Patel, E.J. Chang and L-P. Wang, 1997. Simulations of dispersed turbulent multiphase flow. *Fluid Dynamics Res.* **20**, 143-156.
- H. Shin and M.R. Maxey, 1997. The chaotic motion of nonspherical particles settling in a cellular flow field. *Phys. Rev. E* **56**, 5431-5444.
- M.R. Maxey and B.K. Patel, 2001. Localized force representations for particles sedimenting in Stokes flow. *Int. J. Multiphase Flow* **27**, 1603-1626.
- S. Lomholt, B. Stenum and M.R. Maxey, 2002. Experimental verification of the force coupling method for particulate flows. *Int. J. Multiphase Flow* **28**, 225-246.
- J. Xu, M.R. Maxey and G.E. Karniadakis, 2002. Numerical simulation of turbulent drag reduction using micro-bubbles. *J. Fluid Mech.* **468**, 271-281.
- D. Liu, M.R. Maxey and G.E. Karniadakis, 2002. A fast method for particulate microflows. *J. Microelectromechanical Systems* **11**, 691-702.

S. Lomholt and M.R. Maxey, 2003. Force coupling method for particles sedimenting in a channel: Stokes flow. *J. Comput. Physics* **184**, 381-405.

E. Climent and M.R. Maxey, 2003. Numerical simulation of random suspensions at finite Reynolds numbers. *Int. J. Multiphase Flow* **29**, 579-601.

S. Dance and M.R. Maxey, 2003. Incorporation of lubrication effects into the force-coupling method for particulate two-phase flow. *J. Comput. Phys.* **189**, 212-238.

S. Dance and M.R. Maxey, 2003. Particle density stratification in transient sedimentation. *Phys. Rev E* **68**, 031403.

E. Climent, M.R. Maxey and G.E. Karniadakis, 2004. Dynamics of self-assembled chaining in magnetorheological fluids. *Langmuir* **20**, 507-513.

S.L. Dance, E. Climent and M.R. Maxey, 2004. Collision barrier effects on the bulk flow in a random suspension. *Phys. Fluids* **16**, 828-831.

D. Liu, M. Maxey and G.E. Karniadakis, 2004. Modeling and optimization of colloidal micro-pumps. *J. Micromech. Microeng.* **14**, 567-575.

S. Dong, D. Liu, M.R. Maxey and G.E. Karniadakis, 2004. Spectral distributed Lagrange multiplier method: algorithm and benchmark tests. *J. Comput. Phys.* **195**, 695-717.

D. Liu, M.R. Maxey and G.E. Karniadakis, 2005. Simulations of dynamic self-assembly of paramagnetic microspheres in confined microgeometries. *J. Micromech. Microeng.* **15**, 2298-2306.

E. Keaveny, I. Pivkin, M. Maxey and G.E. Maxey, 2005. A comparative study between dissipative particle dynamics and molecular dynamics for simple- and complex geometry flows. *J. Chem. Phys.* **123**, 104107.

M.Y. Stephens, R.J. Oglesby and M. Maxey, 2005. A one-dimensional mixed layer ocean model for use in three-dimensional climate simulations: Control simulation compared to observations. *J. Climate* **18**, 2199-2221.

M. Abbas, E. Climent, O. Simonin and M.R. Maxey, 2006. Dynamics of bidisperse suspensions under Stokes flow: Linear shear flow and sedimentation. *Phys. Fluids* **12**, 121504.

R. Kunz, H. Gabeling, M. Maxey, G. Tryggvason, A. Fontaine and S. Ceccio, 2007. Validation of two-fluid Eulerian CFD modeling for microbubble drag reduction across a wide range of Reynolds numbers. *J. Fluids Eng.* **129**, 66-79.

E. Climent, K. Yeo, M.R. Maxey and G.E. Karniadakis, 2007. Dynamic self-assembly of spinning particles. *J. Fluids Eng.* **129**, 379-387.

- J. Xu, S. Dong, M.R. Maxey and G.E. Karniadakis, 2007. Turbulent drag reduction by constant near-wall forcing. *J. Fluid Mech.* 582, 79-101.
- E.E. Keaveny and M.R. Maxey, 2008. Spiral swimming of an artificial micro-swimmer. *J. Fluid Mech.* 598, 293-319.
- E.E. Keaveny and M.R. Maxey, 2008. Interactions between co-moving magnetic micro-swimmers. *Phys. Rev. E* 77, 041910.
- V. Dobrushkin and M.R. Maxey, 2008. An improved boundary element formulation for the motion of spherical bubbles. *Differential Equations* 44, 1-8.
- E.E. Keaveny and M.R. Maxey, 2008. Modeling the magnetic interactions between paramagnetic beads in magnetorheological fluids. *J. Comput. Phys.* 227, 9554-9571.
- X. Luo, M.R. Maxey and G.E. Karniadakis, 2009. Smoothed profile method for particulate flows: Error analysis and simulations. *J. Comput. Phys.* 228, 1750-1769.
- D. Liu, E.E. Keaveny, M.R. Maxey and G.E. Karniadakis, 2009. Force coupling method for flow with ellipsoidal particles. *J. Comput. Phys.* 228, 3559-3581.
- S. Dong, K. Yeo, M.R. Maxey and E. Climent, 2010. Modulation of homogeneous turbulence seeded with finite size bubbles or particles. *Int. J. Multiphase Flow* 36, 221-233.
- K. Yeo and M.R. Maxey, 2010. Simulation of concentrated suspensions using the force-coupling method. *J. Comput. Phys.* 229, 2401-2421.
- K. Yeo and M.R. Maxey, 2010. Dynamics of concentrated suspensions of non-colloidal particles in Couette flow. *J. Fluid Mech.* 649, 205-231.
- K. Yeo and M.R. Maxey, 2010. Ordering transition of non-Brownian suspensions in confined steady shear flow. *Phys. Rev. E.* 81, 051502.
- K. Yeo and M.R. Maxey, 2010. Rheology and ordering transitions of non-Brownian suspensions in a confined shear flow: Effects of external torques. *Phys. Rev. E.* 81, 062501.
- K. Yeo and M.R. Maxey, 2010. Anomalous diffusion in wall-bounded non-Brownian suspensions in a steady shear flow. *European Phys. Lett.* 92, 24008.
- M.R. Maxey, 2011. Biomimetics and ciliary propulsion. *J. Fluid Mech.* 678, 1-4.
- K. Yeo and M.R. Maxey, 2011. Numerical simulations of concentrated suspensions of monodisperse particles in a Poiseuille flow, *J. Fluid Mech.* 682, 491-518.

B. Rosa, L.-P. Wang, M.R. Maxey, and W.W. Grabowski, 2011. An accurate and efficient method for treating aerodynamic interactions of cloud droplets. *J. Comput. Phys.* 230, 8109-8133.

G. Li, J. Bensson, L. Nisimova, D. Munger, P. Mahautmr, J. X. Tang, M.R. Maxey and Y.V. Brun, 2011. Accumulation of swimming bacteria near a solid surface. *Phys. Rev. E* 84, 041932.

Conference papers

M.R. Maxey, 1985. On aerosol particle settling in homogeneous turbulence, 5th Symposium on Turbulent Shear Flows, Cornell University (August 1985).

M.R. Maxey, 1985. A study of aerosol particles settling in homogeneous turbulence, 7th Symposium on Turbulence and Diffusion of the American Meteorological Society (November 1985).

L. Sirovich, M.R. Maxey and H. Tarman, 1987. Analysis of turbulent thermal convection, 6th Symposium on Turbulent Shear Flows, Toulouse, France (September 1987).

S. Balachandar and M.R. Maxey, 1987. On Aerosol particle coagulation in homogeneous turbulence, 6th Symposium on Turbulent Shear Flows, Toulouse, France (September 1987).

M.R. Maxey and S. Balachandar, 1989. Simulation results on the coagulation of aerosol particles in homogeneous turbulence, International Conference on Mechanics of Two-Phase Flows, Taipei, Taiwan (June 1989).

R.A. Katz and M.R. Maxey, 1992. Mechanics underlying transitional and turbulent boundary layer flow-induced noise in underwater acoustics, Proceedings of the 14th International Congress on Acoustics, Vol. I, B6-B8 (September 1992).

L-P. Wang and M.R. Maxey, 1992. Kinematical descriptions for mixing in stratified or homogeneous shear flows.

M.R. Maxey, 1993. The equation of motion for a small rigid sphere in a nonuniform or unsteady flow, ASME FED-Vol. 166, 57-62, Intl. Symp. on Gas-Solid Flows (June 1993).

L-P. Wang and M.R. Maxey, 1993. Interactions of heavy particles with small-scale flow structures in homogeneous isotropic turbulence, ASME-FED Vol. 166, 113-120, Intl. Symp. on Gas-Sold Flows, Washington, D.C. (June 1993).

M.R. Maxey, 1993. Characteristics of small droplet motion in turbulence, AIAA Paper 93-1877, AIAA/SAE/ASME/ASEE 29th Joint Propulsion Conference, Monterey, CA (June 1993).

M.R. Maxey, L-P. Wang and E.J. Chang, 1993. Interactions of particles and microbubbles with turbulence, Proceedings of the Third International Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics, Hawaii (October 1993).

L-P. Wang and M.R. Maxey, 1995. Particle transport in 3-D hyperviscous turbulence, ASME-FED Vol. 228, 419-424, 6th International Symposium on Gas-Solid Flows, Hilton Head, S.C. (August 1995).

M.R. Maxey and B.K. Patel, 1997. Force-coupled simulations of particle suspensions at zero and finite Reynolds numbers, ASME Fluids Engin. Div. Paper 97-3183.

M.R. Maxey and G.L. Dent, 1998. Some features of particle sedimentation at finite Reynolds numbers, Third International Conference on Multiphase Flow, ICMF'98, Lyon, France (June 1998).

Y. Hagiwara, H. Hana, S. Murai, M. Tanaka and M.R. Maxey, 1998. Local effect of polymers used for drag reduction on turbulent solvent duct flow, Third International Conference on Multiphase Flow, ICMF'98, Lyon, France (June 1998).

Y. Hagiwara, H. Hana, M. Tanaka and M.R. Maxey, 1998. A numerical simulation on the heat transfer attenuation due to tangled polymers in a liquid turbulent channel flow, Proceedings of 11th International Heat Transfer Conference Vol 4, Kyongju, Korea (August 1998).

M.R. Maxey, 1999. Examples of fluid-particle interactions in dispersed two-phase flow, AIAA Paper 99-3691.

D. Liu, M. Maxey and G.E. Karniadakis, 2001. A fast algorithm for particulate micro-flows in complex geometries. Proceedings of 2001 ASME International Mechanical Engineering Congress and Exposition, New York, N.Y. (November 2001).

S. Dong, D. Liu, M.R. Maxey and G.E. Karniadakis, 2003. Fast methods for colloidal microdevices. AIAA paper 2003-0437. 41st Aerospace Sciences Meeting & Exhibit, Reno, Nevada, January 6-9 2003.

J. Xu, M.R. Maxey and G.E. Karniadakis, 2003. DNS of turbulent drag reduction using micro-bubbles. AIAA paper 2003-1280. 41st Aerospace Sciences Meeting & Exhibit, Reno, Nevada, January 6-9 2003.

D. Liu, M.R. Maxey and G.E. Karniadakis, 2003. Simulation and optimization of colloidal micropumps. Proc. 6th International Conference on Modeling and Simulation of Microsystems, San Francisco, Feb. 23-27, 2003.

M.R. Maxey, J. Xu, S. Dong and G.E. Karniadakis, 2003. Simulations of turbulent drag reduction using micro-bubbles. Proc. 4th Symposium on Smart Control of Turbulence, University of Tokyo, Japan, March 2-4, 2003.

D. Liu, M. Maxey, and G.E. Karniadakis, 2003. FCM-spectral element method for simulating colloidal micro-devices. Proc. of 2nd MIT Conference on Computational Fluid and Solid Mechanics, June 17-20, 2003, edited by K.J. Bathe. Elsevier

M.R. Maxey, J. Xu, S. Dong and G.E. Karniadakis, 2003. Simulation results for micro-bubbles and turbulent drag reduction. Proc. FEDSM'03, 4th ASME-JSME Joint Fluids Engineering Conference, Honolulu, Hawaii, USA, July 6-11, 2003. (FEDSM2003-45638)

M.R. Maxey, S. Dong, D. Liu, and J. Xu, 2003. Simulation of particulate flows with the force-coupling method. Proc. FEDSM'03, 4th ASME-JSME Joint Fluids Engineering Conference, Honolulu, Hawaii, USA, July 6-11, 2003. (FEDSM2003-45713)

D. Liu, M. Maxey, and G. E. Karniadakis, "An Efficient Algorithm for Simulating Micro-Colloidal Devices", *Abstracts of Seventh U.S. National Congress on Computational Mechanics*, July 28-30, 2003, Albuquerque, New Mexico.

M. Maxey, D. Liu, G. E. Karniadakis and E. Climent, 2004. Self-Assembled Particle Structures for Microflow System. 5th International Conference on Multiphase Flow - ICMF04, Paper no. K02, May 30-June 4, 2004, Yokohama, Japan.

E. Climent and M.R. Maxey, 2004. Settling and instability of bidisperse suspensions. 5th International Conference on multiphase Flow – ICMF04, Paper no. 496, May 30-June 4, 2004, Yokohama, Japan.

M. R. Maxey, D. Liu, S. Dong, G. E. Karniadakis, 2004. New Advances in Force-Coupling Method: from micro to Macro. IUTAM Symposium on Computational Approaches to Disperse Multiphase Flow, October 4-7, 2004. Argonne National Laboratory, Argonne, Illinois.

D. Liu, M. Maxey, G. E. Karniadakis, 2004. Dynamic Self-Assembly in Micro-pipes: Effect of Net Flow. Proceedings of 2004 ECI conference: Transport Phenomena in Micro and Nano-devices, October 17-21, 2004, Kona, Hawaii.

D. Liu, M. Maxey, G. E. Karniadakis, 2004. Dynamic Self-Assembly in Confined Micro-Domains. Proceedings of 2004 ASME International Mechanical Engineering Congress and RD & D Exposition, November 13-19, 2004, Anaheim, California.

S. Dong, J. Xu, M.R. Maxey and G.E. Karniadakis, 2005. Slippery issues in microbubble drag reduction. AIAA paper 2005-23933. 43rd Aerospace Sciences Meeting & Exhibit, Reno, Nevada, January 2005.

J. Xu, S. Dong, M.R. Maxey and G.E. Karniadakis, 2005. Wall slippage effect in microbubble drag reduction. Proceedings of 2nd International Symposium on Seawater Drag Reduction, Busan, Korea, May 23-26, 2005.

S. Dong, J. Xu, M.R. Maxey and G.E. Karniadakis, 2005. Microbubble dynamics in turbulent channel flow. Proceedings of 2nd International Symposium on Seawater Drag Reduction, Busan, Korea, May 23-26, 2005.

M.R. Maxey, S. Dong, J. Xu and G.E. Karniadakis, 2005. Simulations for microbubble drag reduction (MBDR) at high Reynolds numbers. Proceedings of the HPCMP Challenge Project, Users Group Conference 2005, Nashville TN, June 27-30, 2005. (Published by IEEE Computer Society)

M.R. Maxey, D. Liu, E.E. Keaveny, G.E. Karniadakis and E. Climent, 2005. Dynamic self-assembly of paramagnetic beads for micro-devices. ASME International Mechanical Engineering Congress – Fluids Engineering Division, Orlando FL, November 5-11, 2005.

X. Luo, M.R. Maxey and G.E. Karniadakis, 2008. Smoothed particle method for particulate flows. ASME Paper FEDSM2008-55033, ASME 2008 Fluids Engineering Division Summer Conference, August 10-14, 2008, Jacksonville, FL, USA.

M.R. Maxey and K. Yeo, 2011. Flow Modulation by Finite Size Particles: From Stokes Suspensions to Turbulence. AIAA Paper 1103293. Sixth AIAA Theoretical Fluid Dynamics Conference, 41st AIAA Fluid Dynamics Conference & Exhibit and 20th AIAA Computational Fluid Dynamics Conference , 27-30 June, 2011, Honolulu, Hawaii.

Papers read (last five years)

November 2006, 59th Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Tampa, FL. Paper:

E.E. Keaveny, M.R. Maxey and G.E. Karniadakis. Simulations of magnetic-microswimmers.

March 2007, American Physical Society Meeting, Denver, CO. Paper:

E.E. Keaveny and M.R. Maxey. Simulations of interacting magnetic microswimmers.

November 2007, 60th Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Salt Lake City, UT. Paper:

E.E. Keaveny, M.R. Maxey. The motion of an artificial micro-swimmer near a rigid surface.

November 2008, 61st Annual Meeting of the Division of Fluid Dynamics, American Physical Society, San Antonio, TX. Papers:

M. Abbas, E. Climent, O. Simonin and M. Maxey. Particle self-diffusion in a viscous shear flow: from hydrodynamic interactions to collisional effects (Paper BQ05)

L-P. Wang, H. Gao, L-S. Luo, Y. Peng, K. Yeo and M.R. Maxey. Comparing particle-resolved simulation methods for moving particles in a viscous fluid (Paper HQ02)

October 2009, 81st Annual Meeting of the Society of Rheology, Madison WI. Papers:

K. Yeo and M.R. Maxey. Numerical simulation of concentrated suspensions of non-colloidal particles in Couette flow (Paper SC3)

K. Yeo and M.R. Maxey. Dynamic self-assembly of non-colloidal particles in Couette flow (Paper PO82)

November 2009, 62nd Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Minneapolis, MN. Paper:

K. Yeo and M.R. Maxey. Order transition in non-colloidal Couette suspension flows: effects of external torques (Paper MT09)

October 2010, 82nd Annual Meeting of the Society of Rheology, Santa Fe, NM. Paper:

K. Yeo and M.R. Maxey. Numerical simulations of concentrated, non-colloidal suspensions in Poiseuille flows

November 2010, 63rd Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Long Beach, CA. Paper:

K. Yeo and M.R. Maxey. Anomalous diffusion of non-colloidal suspensions in a Couette flow

March 2011, 55th Annual Meeting of the Biophysical Society, Baltimore, MD. Paper:

L. Nisimova, J. Bensson, G. Li, M. Maxey, J.X. Tang. Tracking bacterial swimming near a solid or air surface.

November 2011, 64th Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Baltimore, MD. Paper:

K. Yeo and M.R. Maxey. Concentrated suspensions in a homogeneous shear flow with finite fluid inertia.

Invited lectures (last 5 years)

Max Planck Institute for the Physics of Complex Systems, Dresden, Germany: International School and Workshop “Dynamics of Inertial Particles: From Ocean and Atmosphere to Planets”, September 1-26, 2008. Invited lecturer.

Max Planck Institute for the Physics of Complex Systems, Dresden, Germany: Colloquium seminar, September 15, 2008.

Levich Institute, City College, New York, NY, March 9, 2010

Sixth AIAA Theoretical Fluid Dynamics Conference: Multiphase Flow, 27-30 June, 2011, Honolulu, Hawaii.

Workshop on Multiscale Computing for Cloud Physics (PetaApps Cloud Physics), University of Delaware, August 15-16, 2011.

Department of Chemical Engineering, University of Florida, Gainesville, FL, March 26, 2012.

Work in review

S.M. Walsh, A. Wentz, O. Aburto-Oropeza, M. Maxey, S. Nagavarapu, H. Leslie, 2011. Market demand and size selective fishing. Submitted to Proc. U.S. Natl. Acad. Sci.

Work in progress

K. Yeo & M.R. Maxey, 2012. Concentrated suspensions in a homogeneous shear flow with finite fluid inertia. To be submitted to Physics of Fluids.

Research Grants

Current awards

National Science Foundation – 1133106 CBET: Particulate and Multiphase Processes Program, Sep 2011 – Aug 2014. P.I. (co-P.I.A. Tripathi, Engineering) “Dispersion in Microfluidic Suspensions: Experiments and Numerical Simulations”

Completed awards

National Science Foundation - ATM8310136, Nov. 1984 - Feb. 1988. “Study of the fallout and dispersion of particles in turbulence and random fields”

National Air and Space Administration, with L. Sirovich, 1986-1987. “Problems in fluid dynamics”

DARPA, University Research Initiative, L. Sirovich-Director, Oct. 1986 - March 1992. “Analysis, Prediction and Control of Turbulent Flows”

DoD, DURIP equipment grant for computer systems, (with L. Sirovich, E. Meiburg). Oct. 1988 - Sept. 1989.

Office of Naval Research - ARI on Dynamics of Bubbly Flows, Nov. 1990-Oct. 1993.
“The dynamics of bubbly flows and the modification of turbulence by microbubbles”

National Science Foundation - DMS 9205227, Sept. 1992-Feb. 1994, Principal Investigator (Co-P.I.'s, C. Jones, D. McClure, L. Sirovich). “Mathematical Sciences Computing Research Environments”

Office of Naval Research - ARI on Dynamics of Bubbly Flows, Nov. 1993-April 1996.
“The dynamics of bubbly flows and the modification of turbulence by microbubbles”

National Science Foundation - STI-9413819, Academic Research Infrastructure Program. Co-P.I. (P.I. G. Karniadakis), Oct. 1994-Sept. 1995. “Acquisition of a parallel supercomputer”

National Science Foundation - CTS9424169 - Fluid, Particulate and Hydraulic Systems Program, May 1995-April 1998. “Interactions of finite-sized particles and turbulence in dispersed two-phase flow”

National Science Foundation - DMS9628601, (with G. Karniadakis, D. Gottlieb, C. Jones and D. McClure), Aug. 1996-July 1997. “Mathematical Sciences Computing Research Environments”

National Science Foundation - CTS9619232 - Fluid, Particulate and Hydraulic Systems Program, Co-P.I. (P.I. G. Karniadakis), Sept. 1997 - Aug. 1998. “A new model for turbulence based on the hydrodynamics - electromagnetism analogy”

National Center for Microgravity Research, USRA 4500-03, Sept. 1998- Oct. 1999.
“Initial investigation of particle interactions and dispersed two-phase flow under low gravity conditions”

DARPA, ATO – Friction Drag Technologies Program, MDA972-01-C-0024, March 2001 – September 2003, Brown University. P.I., with G. Karniadakis and B. Caswell co-PI's at Brown University. “Microbubble and microbubble/polymer turbulent drag reduction”

DARPA, ATO – Friction Drag Technologies Program, subcontract through ARL – Penn State Univ., November 2003 – June 2006. P.I. (co-P.I. G. Karniadakis) at Brown University. “Multiscale physical modeling for micro-bubble drag reduction at high Reynolds numbers” (RFP 04-15)

National Science Foundation – CTS 0326702 - Particulate and Multiphase Processes Program, Jan 2004 – Dec 2007. P.I. (co-P.I. G. Karniadakis) “Simulation of Magnetorheological Fluids: Microdevices and Self-Assembled Structures”

National Science Foundation – DMS 0506312 - Multiscale Modeling: BBB, Sep 2005 – Aug 2009. Co-P.I. (P.I. G.E. Karniadakis and co-P.I. P.D. Richardson) “A Stochastic Molecular Dynamics Method for Multiscale Modeling of Blood Platelet Phenomena”

National Science Foundation – DUE 0734234 – Div. of Undergraduate Education, Oct 2007 – Sep 2011. P.I. (co-P.I.'s: C. Lawrence, G. Karniadakis, P.D. Richardson, J.X. Tang). UBM-Group: Undergraduate Training and Research in Applied Mathematics and Biological Sciences.

Service

Service to the University (last 10 years)

- Director, Center for Fluid Mechanics, Turbulence and Computation (1991-)
- Graduate Committee, Division of Applied Mathematics (2000-2002)
- Chair, Undergraduate Committee and Concentration advisor - Division of Applied Mathematics (2004-2007)
- Member – Brown University Tenure, Promotion and Appointments Committee (TPAC) (Jan 2006 – May 2008). Committee chair, September 2007 – May 2008.
- Member – Brown University Faculty Executive Committee, January-June 2010
- Various departmental committees in the Division of Applied Mathematics or the School of Engineering for tenure and promotion or faculty search committees
- Chair, Computer Committee, Division of Applied Mathematics (Sept 2009 – June 2011)
- Chair, Library Committee, Division of Applied Mathematics (June 2011–)

Service to the profession (last 10 years)

Editorial Advisory Board, International Journal of Multiphase Flow, 1997 - 2010.

Scientific Committee – 2nd International Symposium on Seawater Drag Reduction, May 23-26, 2005, Busan, Korea

Elected to Executive Committee – Division of Fluid Dynamics, American Physical Society, November 2006 – November 2009

Fluid Dynamics Prize Committee, Division of Fluid Dynamics, American Physical Society. Vice-Chair 2007 and Chair 2008

Corrsin Award Committee, Division of Fluid Dynamics, American Physical Society. Vice-Chair 2011 and Chair 2012

Associate editor, Fluid Dynamics Research, January 2009 –December 2010

Editor, Fluid Dynamics Research, January 2011 –December 2014
Scientific Committee, Intl. Conf. Multiphase Flow, Tampa FL, May 30 – June 4, 2010

Referee for National Science Foundation, US - Israel Bi-national Science Foundation,
Swiss National Science Foundation, Petroleum Research Fund, etc.

Referee for the Journal of Fluid Mechanics, Physics of Fluids, International Journal of
Multiphase Flow, ASME Journal of Fluids Engineering, Journal of the Atmospheric
Sciences, Physical Review E, Physical Review Letters, Quarterly of Applied
Mathematics, Journal of Computational Physics, Theoretical & Computational Fluid
Dynamics, Fluid Dynamics Research and other journals.

Referee for external tenure and promotion reviews in the area of fluid mechanics.

Member: American Geophysical Union; American Institute of Aeronautics &
Astronautics, American Physical Society; American Society of Mechanical Engineers;
Society for Industrial and Applied Mathematics; Society of Rheology; Sigma Xi.

Academic awards

Fellow, American Physical Society, elected September 2005.

Japan Society for the Promotion of Science, Invited Research Fellow, 1997.

Rayleigh Essay Prize, University of Cambridge, 1977.

Research Scholarship and College Prize, Trinity Hall, Cambridge, 1975.

Scholarship and College Prize, Trinity Hall, Cambridge, 1972 and 1973.

Teaching (last 3 years)

2008-2009

Fall: Sabbatical leave

Spring: AM194 Mathematical Models in Biophysics (senior seminar) (6 students)

AM242 Fluid Dynamics II (15 students)

PhD student advisees: 1

2009-2010

Fall: APMA1070 Quantitative Models of Biological Systems (6 students)

APMA1970 Independent Study (1 student)

Spring: APMA2420 Fluid Dynamics II (5 students)

PhD student advisees: 1

Freshmen advisees: 6

2010-2011

Fall: APMA1070 Quantitative Models of Biological Systems (8 students)

APMA1970 Independent Study (1 student)

Spring: APMA2420 Fluid Dynamics II (4 students)

APMA 1970 Independent Study (1 student)

PhD student advisees: 2

Freshmen advisees: 5

Sophomore advisees: 6

2011-2012

Fall: APMA1070 Quantitative Models of Biological Systems (7 students)

Spring: APMA2420 Fluid Dynamics II

PhD student advisees: 1

Freshmen advisees: 5

Sophomore advisees: 6

Ph.D theses supervised

S. Balachandar. Particle coagulation in homogeneous turbulence (January, 1988).

H. Shin. Chaotic Sedimentation of nonspherical particles (May, 1990).

G. Ruetsch. The structure and dynamics of the vorticity and passive scalar fields at small scales in homogeneous isotropic turbulence (June, 1991).

R. Mallier. Weakly nonlinear waves in mixing layers (September, 1991).

D. Mello. The stability of oscillatory flow in a circular pipe (December, 1991).

R. Katz. Transitions to turbulence: determinism in nature (February, 1992).

E. Chang. Accelerated motion of rigid spheres in unsteady flow at low to moderate Reynolds numbers (April, 1992).

B. Patel. Problems in turbulence and two-phase flow (May, 1996).

M. Stephens. A one-dimensional mixed-layer ocean model for use in three-dimensional climate simulations (Nov, 1997. Supervised in collaboration with Professor T. Webb, Dept of Geological Sciences.)

G. Dent. Aspects of particle sedimentation in dilute flows at finite Reynolds numbers (May, 1999).

S. Dance. Particle sedimentation in viscous fluids (May, 2002).

D. Liu. Simulations of dispersed two-phase flows (May 2004). (Supervised in collaboration with G. Karniadakis)

J. Xu. Turbulent drag reduction by injection of microbubbles (May, 2005). (Supervised in collaboration with G. Karniadakis)

E. Keaveny. Dynamics of structures in active suspensions of paramagnetic particles and applications to artificial micro-swimmers (May 2008).

Kyong-Min Yeo. Some aspects of suspension flows: Stokes to turbulent flows (May 2011)

N. Trask (in progress)