Kausik Sarkar

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Education

Ph.D. (1994) in Mechanical Engineering, The Johns Hopkins University, Baltimore
Thesis: "Effective Boundary Conditions for Rough Surfaces and Acoustics of Oceanic Bubbles"

M.S. (1990) in Mechanical Engineering, The Johns Hopkins University, Baltimore
Thesis: "A Numerical Study of the Ginzburg-Landau Equation in Thermo-capillary Flow"

B.Tech. (1988) Indian Institute of Technology, Kharagpur, India
Thesis: "Concepts of Ship-Propeller Design by Lifting Line and Lifting Surface Theory" and "Design of a Container Ship"

Professional Experience

2007- date	Associate Professor of Mechanical Engineering, University of Delaware
2001- 2007	Assistant Professor of Mechanical Engineering, University of Delaware
1997-2001	Post-doctoral Research Associate, University of Illinois at Urbana Champaign
1994-1997	Research Scientist, Dynaflow Inc., Maryland
1988-1994	Research Assistant, Johns Hopkins University

Awards and Honors

2006	Marquis Who's Who in America
2007	Marquis Who's Who in America
2007	Nominated for Excellence in Teaching Award
2007	Allan P Colburn award for best dissertation in Engineering and Physical Sciences in University of Delaware by student (Xiaoyi Li)
2009	Andreas Acrivos Dissertation Award in Fluid Dynamics from American Physical Society to student (Xiaoyi Li)

Publications

Book

1. Li X, Sarkar K **2008** "Computational Study of Fluid Particles: Dynamics of Drops, Rheology of Emulsions, and Mechanics of Biological Cells," VDM Verlag, ISBN-10: 3639070089.

Peer-reviewed journal articles

1. Sarkar K **2010** "Dissolution of an encapsulated gas bubble: effects of encapsulation permeability on unsteady Epstein-Plesset model," in preparation.

2. Li X, Sarkar K **2010** "3-D computational study of deformation-induced lift on receptor-ligand-mediated cell adhesion to substrates," in preparation.
3. Li X, Singh R, Sarkar K **2010** "Lateral migration of an elastic capsule in a wall-bounded shear," in preparation.
4. Li X, Sarkar K **2010** "Rheology of a viscous emulsion in an oscillating extensional flow at finite inertia," in preparation.
5. Singh R, Sarkar K **2010** "Inertial effects on the dynamics of a drop in a shear and the dispersed stresses," in preparation.
6. Mukherjee S, Sarkar K **2010** "Viscoelastic drop falling through viscous liquid," in preparation.
7. Paul S, Katiyar A, Sarkar K, Chatterjee D, Forsberg F **2010** "Material Characterization of contrast microbubbles using a nonlinear interfacial elasticity model of the encapsulation," *Journal of the Acoustical Society of America*, 127, 3846-3857.
8. Katiyar A, Sarkar K, **2010** "Stability Analysis of an Encapsulated Microbubble against Gas Diffusion," *Journal of Colloid and Interface Science*, 343, 42-47.
9. Mukherjee S, Sarkar K **2010** "Effects of viscoelasticity on the retraction of a sheared drop," *Journal of Non-Newtonian Fluid Mechanics*, 165, 340-349.
10. Singh R, Sarkar K **2009** "Effects of viscosity ratio and three dimensional positioning on hydrodynamic interactions between two viscous drops in a shear flow at Finite Inertia," *Physics of Fluids,* 21, 103303.
11. Katiyar A, Sarkar K, Jain P, **2009** "Effects of encapsulation elasticity on the stability of an encapsulated microbubble," *Journal of Colloid and Interface Science*, 336, 519-525.
12. Olapade P, Singh R, Sarkar K **2009** "Pair-wise interactions between deformable drops in a shear at finite inertia," *Physics of Fluids*, 21, 063302.
13. Mukherjee S, Sarkar K **2009** "Effects of viscosity ratio on deformation of a viscoelastic drop in a Newtonian matrix under steady shear," *Journal of Non-Newtonian Fluid Mechanics*, 160, 104-112.
14. Sarkar K, Katiyar A, Jain P **2009** "Growth and dissolution of an encapsulated contrast microbubble," *Ultrasound in Medicine and Biology*, 35, 1385-1396.
15. Aggarwal N, Sarkar K **2008** "Effects of matrix viscoelasticity on viscous and viscoelastic drop deformation in a shear flow," *Journal of Fluid Mechanics*, 601, 63-84.
16. Li X, Sarkar K **2008** "Front-tracking simulation of a liquid capsule enclosed by an elastic membrane," *Journal of Computational Physics*, 227, 4998-5018.
17. Aggarwal, N, Sarkar K **2008** "Rheology of an emulsion of viscoelastic drops in steady shear," *Journal of Non-Newtonian Fluid Mechanics*, 150, 19-31.
18. Aggarwal N, Sarkar K **2007** "Deformation and breakup of a viscoelastic drop in a Newtonian matrix under steady shear," *Journal of Fluid Mechanics*, 584, 1-21.
19. Cao Q, Sarkar K, Prasad AK **2006** "Direct numerical simulation of three-layer viscosity-stratified flow," *The Canadian Journal of Chemical Engineering*, 84(5), 548-557.
20. Li X, Sarkar K **2006** "Drop deformation and breakup in a potential vortex," *Journal of Fluid Mechanics*, 564, 1-23.
21. Li X, Sarkar K **2005** "Negative normal stress elasticity of emulsion of viscous drops at finite inertia," *Physical Review Letters*, 95, 256001.

22. Li X, Sarkar K **2005** "Effects of inertia on the rheology of a dilute emulsion of viscous drops in steady shear," *Journal of Rheology*, 49, 1377-1394.
23. Chatterjee D, Sarkar K, Jain P **2005** "Ultrasound mediated destruction of contrast microbubbles used for medical imaging and drug delivery," *Physics of Fluids*, 17,100603.
24. Sarkar K, Shi WT, Chatterjee D, Forsberg F **2005** "Characterization of ultrasound contrast microbubbles using *in vitro* experiments and viscoelastic models for encapsulation," *Journal of the Acoustical Society of America*, 118, 539-550.
25. Li X, Sarkar K **2005** "Numerical investigation of the rheology of a dilute emulsion of drops in an oscillating extensional flow," *Journal of Non-Newtonian Fluid Mechanics*, 102, 263-280.
26. Chatterjee D, Sarkar K, Jain P, Schreppler N **2005** "On the suitability of broadband attenuation measurement for characterizing contrast microbubbles," *Ultrasound in Medicine and Biology*, 31,781-786.
27. Li X, Sarkar K **2005** "Drop dynamics in an oscillating extensional flow at finite Reynolds numbers," *Physics of Fluids*, 17, 027103**.**
28. Cao Q, Sarkar K, Prasad AK **2004** "Direct numerical simulation of two-layer viscosity-stratified flow," *International Journal of Multiphase Flow*, 30, 1484-1508.
29. Chatterjee D, Sarkar K **2003** "A Newtonian rheological model for the interface of microbubble contrast agents," *Ultrasound in Medicine and Biology*, 29, 1749-1757.
30. Sarkar K, Schowalter WR **2002** "Computation of a viscous jet with embedded drops," *Journal of Non-Newtonian Fluid Mechanics*, 102, 263-280.
31. Sarkar K, Schowalter WR **2001** "Deformation of a two-dimensional drop at non-zero Reynolds number in time-periodic extensional flows: numerical simulation," *Journal of Fluid Mechanics*, 436, 177-206.
32. Sarkar K, Schowalter WR **2001** "Deformation of a two-dimensional drop in time-periodic extensional flows: analytic treatment," *Journal of Fluid Mechanics*, 436, 207-230.
33. Sarkar K, Schowalter WR **2000** "Deformation of a viscoelastic drop in time-periodic extensional flows at non-zero Reynolds number," *Journal of Non-Newtonian Fluid Mechanics*, 95, 315-342.
34. Duraiswami R, Sarkar K, Chahine GL **1998** "Efficient dual reciprocity boundary element techniques for electrical impedance tomography," *Engineering Analysis with Boundary Elements,* 22, 13-31.
35. Duraiswami R, Sarkar K, Chahine GL **1996** "Boundary element techniques for efficient 2D and 3D elctrical impedance tomography," *Chemical Engineering Science,* 52, 2185-2196.
36. Sarkar K, Prosperetti A **1996** "Effective boundary conditions for Stokes flow over a rough surface," *Journal of Fluid Mechanics*, 316, 223-240.
37. Sarkar K, Prosperetti A **1995** "Effective boundary conditions for Laplace Equation with a Rough Boundary," *Proceedings of the Royal Society of London A*, 451, 425-453.
38. Sarkar K, Prosperetti A **1994** "Coherent and incoherent scattering by oceanic bubbles." *Journal of the Acoustical Society of America*, 96, 332-341.
39. Sarkar K, Prosperetti A **1993** "Backscattering of underwater noise by bubble clouds," *Journal of the Acoustical Society of America*, 93, 3128-3138.
40. Sarkar K, Meneveau C **1993** "Gradients of potential fields on rough surface: perturbative calculation of the singularity distribution function $f(\alpha)$ for small surface," *Physical Review E*, 47, 957-966.

Peer-reviewed conference proceedings

1. Sarkar K, Jain P, Chatterjee D **2008** "Modeling and characterization of encapsulated contrast microbubbles for ultrasound imaging and drug delivery," *Proceedings of XVth International Congress of Rheology*.
2. Sarkar K, Jain P **2007** "Growth and dissolution of encapsulated microbubbles used for contrast imaging and drug delivery," *Proceedings of 6th International Conference on Multiphase Flow*, ICMF 2007, Leipzig, Germany S2_Tue_B_20.
3. Aggarwal N, Sarkar K **2007** "Numerical investigation of effects of viscoelasticity on drop deformation and emulsion rheology," *Proceedings of 6th International Conference on Multiphase Flow*, ICMF 2007, Leipzig, Germany S2_Tue_D_29.
4. Li X, Sarkar K **2007** "A 3D computational investigation of deformation-induced lift on the receptor-ligand mediated cell adhesion to substrates," *Proceedings of 6th International Conference on Multiphase Flow*, ICMF 2007, Leipzig, Germany S2_Tue_B_18.
5. Aggarwal N, Sarkar K **2007** "Effects of viscoelasticity on drop deformation in shear flows," *Proceedings of 2007 5th Joint ASME/JSME Fluids Engineering Conference*, FEDSM2007-37577.
6. Li X, Sarkar K **2007** "Front-tracking simulation of a liquid capsule enclosed by an elastic membrane," *Proceedings of 2007 5th Joint ASME/JSME Fluids Engineering Conference*, FEDSM2007-37575.
7. Li X, Sarkar K **2006** "Effects of deformation-induced lift on receptor-ligand mediated cell adhesion to a substrate explored by a 3D computational fluid dynamics approach," *Proceedings of 2006 ASME Joint U.S.-European Fluids Engineering Summer Conference*, FEDSM2006-98549.
8. Jain P, Sarkar K **2006** "Growth and dissolution of encapsulated microbubbles used in ultrasound contrast imaging," *Proceedings of 2006 ASME Joint U.S.-European Fluids Engineering Summer Conference*, FEDSM2006-98550.
9. Sarkar K, Jain P, Chatterjee, D **2005** "Characterization and ultrasound-pulse mediated destruction of ultrasound contrast microbubbles," *Innovations in Nonlinear Acoustics, 17th International Symposium on Nonlinear Acoustics (Ed. Atchley et al)*, 271-274.
10. Sarkar K, Jain P, Chatterjee D **2004** "Modeling thin-walled microbubbles for medical ultrasound," *Proceedings of ASME-International Mechanical Engineering Congress and R&D Expo* IMECE2004-61645.
11. Sarkar K, Jain P, Chatterjee D **2004** "Destruction of Definity® microbubbles used for ultrasound contrast imaging," *Proceedings of ASME-International Mechanical Engineering Congress and R&D Expo,* IMECE2004-61646.
12. Sarkar K, Li X **2004** "Oscillating extensional rheology of emulsion of drops at finite Reynolds number," *Proceedings of 2004 ASME Heat Transfer-Fluids Engineering Summer Conference*, HT-FED04-56648.
13. Sarkar K, Duraiswami R, Chahine GL **1996** "Numerical Simulation of Separated Cavitation Behind a Sphere," *ASME Cavitation Multiphase Flow Forum*, FED-**236**, 479-484.
14. Sarkar K, Duraiswami R, Chahine GL **1995** "Three-dimensional numerical simulation of bubble-vortical flow interaction," *ASME Cavitation Multiphase Flow Forum*, FED-**210**, 135-143.
15. Ohearn TJO, Torczynski J, Ceccio SL, Tassin AL, Chahine GL, Duraiswami R, Sarkar K **1995** "Development of an Electrical Impedance Tomography, System for an Air-Water Vertical Bubble Column," *Proceedings of the Forum on Measurement Techniques in Multiphase Flows the Winter Annual Meeting of the ASME*.

Conference presentations

1. Katiyar A, Sarkar K, **2009** "Effects of encapsulation elasticity on the stability of an encapsulated contrast microbubble for medical imaging and drug delivery," presented at the 62nd *Annual Meeting of the Division of Fluid Dynamics, American Physical Society,* Minnesota, Minneapolis, November 22-24, 2009.
2. Singh R, Sarkar K, **2009** "Trajectories of a pair of drops in steady shear at finite inertia: effects of viscosity ratio and positioning," presented at the 62nd *Annual Meeting of the Division of Fluid Dynamics, American Physical Society,* Minnesota, Minneapolis, November 22-24, 2009.
3. Mukherjee S, Sarkar K, **2009** "Effects of viscoelasticity on retraction of a sheared drop," presented at the 62nd *Annual Meeting of the Division of Fluid Dynamics, American Physical Society,* Minnesota, Minneapolis, November 22-24, 2009.
4. Sarkar K, Chatterjee D, Jain P, Katiyar A **2008** "Modeling encapsulated contrast microbubbles for ultrasound imaging and drug delivery," *XVth Internal Congress of Rheology,* Monterey, California, August 3-8 2008 **(Invited Talk)**.
5. Sarkar K, Jain P **2007** "Growth and dissolution of a contrast microbubble: Effects of encapsulation," *154th Meeting of the Acoustical Society of America,* New Orleans, Louisiana, November 27-December 1, 2007.
6. Sarkar K, Aggarwal N **2007** "Effects of matrix viscoelasticity on drop deformation in steady shear," presented at the 60th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society,* Salt Lake City, Utah, November 18-20, 2007.
7. Aggarwal N, Sarkar K **2006**, "Dynamics of a viscoelastic drop in a Newtonian matrix in steady shear" presented at the 59th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society,* Tampa Bay, Florida, November 19-21, 2006.
8. Li X, Sarkar K **2006** "Deformation-induced Lift on Receptor-Ligand Mediated Cell Adhesion to Substrates Explored by a 3-D Computational Fluid Dynamics approach," presented at the 59th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society,* Tampa Bay, Florida, November 19-21, 2006.
9. Sarkar K, Jain P **2006** "Growth and dissolution of encapsulated microbubbles used in ultrasound contrast imaging," *2006 ASME Joint U.S.-European Fluids Engineering Summer Meeting,* Miami, Florida, July 17-20, 2006.
10. Sarkar K, Li X **2006** "Effects of deformation-induced lift on receptor-ligand mediated cell adhesion to a substrate explored by a 3D computational fluid dynamics approach," *2006 ASME Joint U.S.-European Fluids Engineering Summer Meeting,* Miami, Florida, July 17-20, 2006
11. Jain P, Sarkar K **2006** "Performance based applications of ultrasound contrast agents in the biomedical field," presented at the *American Physical Society March Meeting*, Baltimore, Maryland, March 13-17 2006.
12. Nishith Aggarwal, Sarkar K **2006** "Effects of viscoelasticity on drop deformation," presented at the *American Physical Society March Meeting*, Baltimore, Maryland, March 13-17 2006.
13. Sarkar K, Li X **2005** "Computational modeling of leucocyte adhesion cascade (LAC)," presented at the 58th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, Chicago, Illinois, November 20-22 2005.
14. Li X, Sarkar K **2005** "Effects of inertia on the rheology of a dilute emulsion of drops in steady shear," presented at the 58th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, Chicago, Illinois, November 20-22 2005.

15. Sarkar K, Jain P, Chatterjee, D **2005** "Destruction of contrast microbubbles used for ultrasound imaging and drug delivery," presented at the *150th Annual Meeting of the Acoustical Society of America*, Minneapolis, Minnesota, October 17-21 2005.
16. Sarkar K, Jain P, Chatterjee, D **2005** "Characterization and ultrasound mediated destruction of ultrasound contrast microbubbles," presented at the *17th International Symposium on Nonlinear Acoustics*, State College, Pennsylvania, July 18-22 2005.
17. Sarkar K, Li X **2005** "Rheology of emulsion of viscous drops at finite inertia," Direct numerical simulation of three-layer viscosity-stratified flow," presented at the *2005 Eastern Sectional Meeting of American Mathematical Society*, Newark, Delaware April2-3 2005 **(Invited Talk).**
18. Prasad A, Cao Q, Sarkar K **2004** "Direct numerical simulation of three-layer viscosity-stratified flow," presented at the 57th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, Seattle, Washington, November 23-25 2004.
19. Li X, Sarkar K **2004** "Oscillating extensional rheology of emulsion of drops at finite Reynolds number : Negative elasticity," presented at the 57th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, Seattle, Washington, November 23-25 2004.
20. Sarkar K, Jain P, Chatterjee D **2004** "Characterization and destruction of Definity® microbubbles used for ultrasound imaging and drug delivery," presented at the 57th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, Seattle, Washington, November 23-25 2004.
21. Sarkar K, Jain P, Chatterjee D **2004** "Modeling thin-walled microbubbles for medical ultrasound," presented at the *2004 ASME International Mechanical Engineering Congress and R&D Expo*, Anaheim, California, November 13-19 2004.
22. Sarkar K, Chatterjee D, Jain P **2004** "Destruction of Definity® microbubbles used for ultrasound contrast imaging," presented at the *2004 ASME International Mechanical Engineering Congress and R&D Expo*, Anaheim, California, November 13-19 2004.
23. Sarkar K, Li X **2004** "Finite Reynolds number two-phase flow with drops," presented in *IUTAM Symposium on "Computational Approaches to Disperse Multi-phase Flow",* Argonne, IL, October 4-7, 2004.
24. Sarkar K, Li X **2004** "Oscillating extensional rheology of emulsion of drops at finite Reynolds number," presented at the *Annual Summer Meeting of ASME Heat Transfer-Fluids Engineering*, Charlotte, North Carolina, July 11-15 2004.
25. Sarkar K, Chatterjee D **2003** "An interfacial rheological model of encapsulated microbubble contrast agents for medical ultrasound," presented at the 56th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, New Jersey, November 23-25 2003.
26. Sarkar K, Li X **2003** "Hydrodynamic interaction between two drops in an oscillatory shear flow: do they attract or repel?", presented at the 56th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, New Jersey, November 23-25 2003.
27. Li X, Sarkar K **2003** "Inertial dynamics in time-periodic straining flows: resonance and nonlinearity," presented at the 56th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, New Jersey, November 23-25 2003.
28. Sarkar K**,** Chatterjee D **2003** "Characterization of ultrasound contrast agent Definity® through experiments and modeling," presented at the 56th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, New Jersey, November 23-25 2003.
29. Sarkar K, Chatterjee D, Shi WT, Forsberg F **2003** "An interfacial rheological model of ultrasound contrast agents: theory & experiments," presented at the 146th *Annual Meeting of the Acoustical Society of America*, Austin, Texas, November 10-14.

30. Sarkar K **2002** "Effect of shear waves on viscoelastic drop deformation," presented at the 74th *Annual Meeting of the Society of Rheology*, Minneapolis, Minnesota, October 13-17.
31. Sarkar K **2001** "Expansion of a drop-laden jet," presented at the 54th *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, San Diego, California, Albuquerque, 21-23 November 2001.
32. Sarkar K, Schowalter WR **2001** "Computation of a free jet with embedded drops," presented at the *Acrivos Symposim*, Greece, 2001.
33. Sarkar K, Schowalter WR **2000** "Viscous/viscoelastic drop deformation in time-dependent straining flow: numerical and analytical analysis," presented at the 53rd *Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, San Diego, California, Albuquerque, 21-23 November 2001.
34. Sarkar K**,** Schowalter WR **1999** "Viscous drop deformation in a time-dependent straining flow: numerical and theoretical Analysis," presented at the *Annual Meeting of the American Institute of Chemical Engineers*, Dallas, Texas, October 31-November 5, 1999.
35. Sarkar K, Schowalter WR **1999** "Further studies on the deformation of a viscoelastic drop in a potential vortex," presented at the *71st Annual Meeting of the Society of Rheology*, Madison, Wisconsin, October 17-21, 1999.
36. Sarkar K**,** Schowalter WR **1998** "Deformation of a viscoelastic drop in the flow induced by a potential vortex," presented at the *70th Annual Meeting of the Society of Rheology*, Monterey, California, October 4-8, 1998.
37. Schowalter WR, Sarkar K **1998** "Recent advances in the modeling of suspensions," presented at the *2ndMeeting of the Hellenic Society of Rheology and International Symposium*, Crete, Greece, August 31-September 2, 1998.
38. Sarkar K, Chahine GL, Duraiswami R **1996** "Numerical simulation of separated cavitation behind a sphere," presented at *Cavitation Multiphase Flow Forum, Summer Meeting, American Society of Mechanical Engineers*, San Diego, California, 7-11 July 1996.
39. Duraiswami R, Sarkar K., Chahine GL **1996** "2D and 3D electrical impedance tomography using dual reciprocity BEM,"presented in *Symposium on Industrial Applications and Recent Developments in BEM, ASME Applied Mechanics & Materials Meeting*, JHU, Baltimore, Maryland, June 12-14, 1996.
40. Sarkar K**,** Duraiswami R, Chahine GL **1996** "Coupling of vortex element and boundary element methods for simulating vortical flows with free surfaces," presented in *Symposium on Industrial Applications and Recent Developments in BEM, ASME Applied Mechanics & Materials Meeting*, JHU, Baltimore, MD., June 12-14, 1996.
41. Sarkar K**,** Duraiswami R, Chahine GL **1995** "Three dimensional numerical simulation of bubble-vortical flow interaction," presented at *Cavitation Multiphase Flow Forum, Summer Meeting, American Society of Mechanical Engineers*, Hilton Head, South Carolina, 13-18 August 1995.
42. Sarkar K, Prosperetti A **1993** "Smoothed boundary conditions for Stokes flow over a rough surface," presented at the *46th Annual Meeting of the Division of Fluid Dynamics, American Physical Society*, Albuquerque, New Mexico, 21-23 November 1993.
43. Sarkar K, Prosperetti A **1993**, "Coherent and incoherent scattering from oceanic bubbles," presented at the *125th Meeting of the Acoustical Society of America*, Ottawa, Canada, 17 May - 21 May 1993.
44. Sarkar K, Prosperetti A **1993** "A unified approach for scattering from bubbles in the ocean," presented at the *1st Graduate Meeting of the American Society of Mechanical Engineers*, Ithaca, New York, 19 March - 20 March 1993.
45. Prosperetti A, Sarkar K **1992** "Enhanced backscattering from bubble cloud distributions on the ocean surface," presented at the *122nd Meeting of the Acoustical Society of America*, Salt Lake City, Utah, 11 May - 15 May 1992.

Technical reports

1. Duraiswami R, Sarkar K, Chahine GL **1995** "2DynaEIT: A Boundary Element Code for Efficient Electrical Impedance Tomography--- Theory and Test Cases," Dynaflow, Inc. Tech Rep. 95012-1.
2. Duraiswami R, Sarkar K., Prabhukumar S, Chahine GL **1995** "BEM Methods for Efficient 2D and 3D Electrical Impedance Tomography," Dynaflow, Inc. Tech Rep. 95006-1NSF.
3. Chahine GL, Sarkar K, Duraiswami R **1994** "Letter Report -- Estimation of Bubble Dynamics Forces," Dynaflow, Inc. Tech. Rep. 94010-1.
4. Sarkar K, Smith MK **1990** "Spontaneous Violation of Reflection Symmetry in Complex Ginzburg-Landau equation," Johns Hopkins University Technical Report.
5. Sarkar K **1988** "Concepts of Ship-Propeller Design by Lifting-Line and Lifting-Surface Theory," B.Tech Project report, IIT, Kharagpur, India.

Invited talks

1. **2009** "Encapsulated microbubbles for ultrasound imaging/drug delivery and cell adhesion to biologically activated substrates," at *Mechanical Engineering, Jadavpur University, India*, 03/16/10.
2. **2010** "Encapsulated microbubbles for ultrasound imaging/drug delivery and cell adhesion to biologically activated substrates," at *Engineering Mechanics, Jawaharlal Nehru Center for Advanced Scientific Research, India*, 03/10/10.
3. **2010** "Encapsulated microbubbles for ultrasound imaging/drug delivery and cell adhesion to biologically activated substrates," at *Mechanical Engineering, Indian Institute of Science, India*, 03/08/10.
4. **2010** "Encapsulated microbubbles for ultrasound imaging/drug delivery and cell adhesion to biologically activated substrates," at *Power Engineering, Jadavpur University, India*, 03/02/10.
5. **2010** "Encapsulated microbubbles for ultrasound imaging/drug delivery and cell adhesion to biologically activated substrates," at *Mechanical Engineering, Indian Institute of Technology, Kharagpur, India*, 02/24/10.
6. **2009** "Encapsulated microbubbles for ultrasound imaging/drug delivery and cell adhesion to biologically activated substrates," at *Mechanical Engineering, Iowa State University*, 02/18/09.
7. **2008** "Encapsulated microbubbles for contrast ultrasound/drug delivery and cell adhesion to biologically activated substrates," at *BIOMS (Biomedical Movement Science program) Seminar, University of Delaware*, 10/17/08.
8. **2008** "Computational study of emulsions: viscous/viscoelastic drops and biological cells," at *Computational Science Group Meeting, University of Delaware*, 10/08/08.
9. **2008** "Ultrasound contrast imaging and drug delivery with microbubbles," at *Department of Mechanical Engineering, University of Maryland at Baltimore County*, 04/04/08.
10. **2008** "What to expect when you shear a viscoelastic drop?" at *Center for Advanced Modeling and Simulation, Idaho national Laboratory*, 03/21/08.
11. **2007** "Microbubbles for contrast ultrasound and cell adhesion," at *Department of Biomedical Engineering, Washington University at St. Louis*, 10/16/07.

12. **2007** "Ultrasound contrast agents: A problem in fluid mechanics," at *The Leading Edge in Diagnostic Ultrasound Annual Conference*, 05/01/07-05/04/07, Bogata Hotel Casino & Spa, Atlantic City, New Jersey.
13. **2007** "Ultrasound contrast agents and cell adhesion," at *Division of Applied Mathematical Sciences Brown University*, 03/19/07.
14. **2007** "Modeling contrast microbubbles: Acoustic response, growth and dissolution," at *Fluid Dynamics Seminar Series, Department of Mathematical Sciences, New Jersey Institute of Technology*, 01/22/07.
15. **2006** "Modeling and characterization of ultrasound contrast agents," at *Bioacoustics Research Laboratory, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign*, 04/06/06.
16. **2005** "Encapsulated Microbubbles for ultrasound imaging and drug delivery," at *Department of Aerospace Engineering and Mechanics, University of Minnesota*, 09/20/05.
17. **2005** "Dynamics of encapsulated microbubbles for ultrasound imaging and drug delivery," at *Polymer Division, NIST*, 08/15/05.
18. **2005** "Modeling contrast microbubbles for ultrasound imaging and drug delivery," at *Department of Mechanical and Industrial Engineering, University of Illinois at Urbana-Champaign*, 06/30/05.
19. **2005** "Modeling contrast microbubbles for ultrasound imaging and drug delivery," at *Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania*, 04/21/05.
20. **2005** "Encapsulated Microbubbles for ultrasound imaging and drug delivery," at *Department of Mathematics, University of Delaware*, 04/05/05.
21. **2004** "Microbubble contrast agents for ultrasound imaging and drug delivery," at *Department of Mechanical Engineering, Boston University*, 12/10/04.
22. **2004** "Microbubble based Ultrasound Contrast Agents," at *Department of Mechanical Engineering, New Jersey Institute of Technology*, 09/08/04.
23. **2004** "Ultrasound Contrast Agents: Modeling and characterization of its interfacial rheology," at *Department of Mechanical Engineering, National University of Singapore*, 01/28/04.
24. **2003** "Ultrasound Contrast Agents: A fresh look at its interfacial rheology," at *DuPont Experimental Station*, 05/12/03.
25. **2001** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *Department of Mechanical and Aerospace Engineering, University of Missouri-Columbia*, 04/11/01.
26. **2001** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *Department of Mechanical Engineering, Southern Methodist University*, 03/27/01.
27. **2001** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *Department of Mechanical Engineering, University of Delaware*, 03/20/01.
28. **2001** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *Department of Mechanical and Nuclear Engineering, Kansas State University*, 03/15/01.
29. **2001** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *School of Mechanical and Materials Engineering, Washington State University*, 03/09/01.
30. **2001** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *School of Mechanical Engineering, Purdue University*, 02/23/01.
31. **2000** "Viscous/Viscoelastic Drop Deformation: Numerical & Theoretical Analysis," at *Center for Simulation of Advanced Rockets, University of Illinois at Urbana-Champaign*, 09/6/00.

Research Grants/Contracts

1. "Collaborative Research: Echogenic lipid nanoparticle for concurrent ultrasound imaging and drug delivery" National Science Foundation, PI, (collaborative –PI: Sanku Mallik, North Dakota State University) 9/11-9/14.
2. "Noninvasive Ultrasonic Pressure Estimation using subharmonic response of Contrast Microbubbles" National Science Foundation, PI, 9/11-9/14.
3. "Targeted Microbubbles for Contrast Enhanced Vascular Ultrasound Imaging" National Institute of Health IDeA Network of Biomedical Research Excellence, INBRE, co-PI, (PI: Karl Steiner) 9/09-9/11.
4. "Noninvasive Subharmonic Pressure Estimation for Monitoring Breast Cancer Response to Neoadjuvant Therapy" National Institute of Health, co-PI (PI Flemming Forsberg, Thomas Jefferson), 04/08-13/11.
5. "Modeling and Characterization of Microbubble Contrast Agents for Medical Imaging and Drug Delivery" National Science Foundation, PI, 01/07-12/11.
6. "Subharmonic Microbubble Signals for Pressure Estimation" National Institute of Health, co-PI (PI Flemming Forsberg, Thomas Jefferson) 01/07-12/09.
7. "Simulation of Leukocyte Adhesion Cascade: Effects of Cell Deformation and Hydrodynamic Interactions between Cells" National Science Foundation, PI, 09/06-08/10.
8. "Dynamics of Encapsulated Microbubbles for Medical Ultrasound" National Science Foundation, CTS-0352829, PI, 3/04-2/05.
9. "Summer Undergraduate Research program" University of Delaware Research Foundation (UDRF), PI, 6/04-8/04.
10. "Modeling and Characterization of Microbubble Contrast Agent for Medical Ultrasound" University of Delaware Research Foundation (UDRF), PI, 6/03-5/04.
11. "Modeling and Characterization of Definity by measuring in vitro attenuation" Bristol-Myers Squibb Imaging, PI, (50 vials of Definity®), 3/03-9/03.
12. "Ultrasound Activated Contrast Imaging of Prostate Cancer Detection" Department of Defense DAMD17-03-1-0119, co-PI, (PI: Flemming Forsberg, Thomas Jefferson) 3/03-3/06.

Research Supervision

PhD:

- Qing Cao, awarded PhD 2004 "Experimental and numerical investigation of viscosity stratified two- and three- layer flow," Co-advised with Ajay Prasad
- Xiaoyi Li, awarded PhD 2007 "Computational emulsion rheology and modeling mechanics of biological cells"
- Swranajy Mukherjee, PhD 2007-date "Computational multiphase flows"
- Amit Katiyar, PhD 2008-date "Acoustics of contrast microbubbles"
- Rajesh Singh, PhD 2008-date "Computational Multiphase flows"
- Shirshendu Paul, PhD 2008-date "Acoustics of contrast microbubbles"

MS:

- Pankaj Jain awarded MS 2006 "Acoustical investigation of ultrasound contrast agents: theory and experiments"
- Nishith Aggrawal awarded MS 2007 "Computational viscoelastic drop deformation and rheology"
- Peter Olapade awarded MS 2007 "Computational studies of pair-wise interactions and drop dynamics in concentrated emulsion at finite inertia"

Post-Doctoral:

- Dhiman Chatterjee 2002-2004 "Experiments and modeling of ultrasound contrast agents" (*Currently, Assistant Professor of Mechanical Engineering in IIT Madras, India*)

Undergraduate:

- Nathan Schreppler 2003-2004
- Brian Tuchband 2003-2004
- Stephanie Frangiaikis 2003
- Julia Li 2005
- Aaron Winn 2005-2006
- Dale Heintzelman 2006
- Daniel Gempesaw 2007
- Amelia House 2007
- Benjamin Keller 2008
- Daniel Russakow 2008-

Teaching

- Spring 2002 MEEG640 Intermediate Heat Transfer
- Fall 2002 MEEG630 Intermediate Fluid Mechanics
- Spring 2003 MEEG640 Intermediate Heat Transfer
- Fall 2003 MEEG331 Fluid Mechanics I
- Spring 2004 MEEG640 Intermediate Heat Transfer
- Spring 2004 MEEG667 Microscale Flows
- Fall 2004 MEEG331 Fluid Mechanics I
- Spring 2005 MEEG640 Intermediate Heat Transfer
- Spring 2005 MEEG667 Microscale Flows with Biological Applications
- Fall 2005 MEEG331 Fluid Mechanics I
- Fall 2005 MEEG331 Fluid Mechanics I Lab
- Spring 2006 MEEG640 Intermediate Heat Transfer
- Fall 2006 MEEG331 Fluid Mechanics I
- Spring 2007 MEEG640 Intermediate Heat Transfer
- Fall 2007 MEEG331 Fluid Mechanics I Lab
- Spring 2008 MEEG640 Intermediate Heat Transfer
- Fall 2008 MEEG640 Intermediate Heat Transfer
- Spring 2009 MEEG342 Heat Transfer
- Fall 2009 Fluid Mechanics I
- Fall 2010 Fluid Mechanics I

University Service

Departmental Committees

2002-2004 Computer Committee
2002-2003 Departmental Webmaster
2003-2004 Faculty Search Committee
2004-2005 Graduate Committee
2006-2009 Safety Committee
2007-2010 Undergraduate Committee
2007-2010 Advisor to Undergraduate Honors Students

College Committees

2003-2004 e-CALC-II Committee
2008- Mechanical Engineering Chair Search Committee

University Committees

2009- Faculty Senate

Professional Society Committees

2004- ASME Fluids Engineering Multiphase Flow Technical Committee
2004- ASME Micro- and Nano-Fluid Dynamics Technical Committee
2006 July 17-20 Coordinator of ASME Forum on Multiphase Flow of Biological Interest
(*2006* ASME *Joint U.S.-European* Fluids Engineering *Summer Conference*, Miami, FL)
2007 July 30-August 2 Coordinator of ASME Forum on Biological Flows
(*2007 Joint ASME/JSME Fluids Engineering Conference,* San Diego, CA)
2008 August 3-8 Co-organizer minisymposium on Interfacial Rheology
(XVth *International Congress of Rheology ICR2008,* Monterey, CA)

2008 August 10-14 Coordinator of ASME Forum on Biological Flows
(*2008 ASME Fluids Engineering Summer Conference*, Jacksonville, FL)

Professional Activity

Membership in professional organizations

- *American Society of Mechanical Engineers*
- *Acoustical Society of America*
- *Society of Rheology*
- *American Physical Society-Division of Fluid Dynamics*

Reviewer for the following journals

- *Proceedings of the Royal Society*
- *Journal of Fluid Mechanics*
- *International Journal of Multiphase flow*
- *ASME Journal of Fluids Engineering*
- *Journal of Rheology*
- *Journal of Non-Newtonian Fluid Mechanics*
- *Physics of Fluids*
- *Journal of the Acoustical Society of America*
- *Ultrasound in Medicine and Biology*
- *Journal of Colloid and Interface Sciences*
- *Journal of Computational Physics*
- *Chemical Engineering Science*
- *Journal of Engineering Mathematics*
- *European Journal of Physics B*
- *Acoustics Research Online*
- *Journal of Ultrasound in Medicine*
- *International Journal for Numerical Methods in Engineering*
- *Microfluidics and Nanofluidics*
- *Langmuir*
- *Computers and Fluids*
- *Acta Biomaterialia*
- *Journal of Hydraulic Engineering*

Reviewer for the following funding agencies

- *NSF Advanced Materials and Manufacturing System Panel*
- *NSF Chemical and Transport Division*
- *US Civilian Research & Development Foundation (CRDF)*
- *ACS Petroleum Research Fund*
- *NASA Fluid Physics Division*
- *DOE Advanced Fuel Cycle*