Bibliography

Abe, T. (1997). Derivation of the lattice Boltzmann method by means of the discrete ordinate method for the Boltzmann equation. *J. Comp. Phys.*, 131:241–246.

Adamczyk, Z. and Warszynski, P. (1996). Role of electrostatic interactions in particle adsorption. *Adv. Colloid Interface Sci.*, 63:41–149.

Aerosoft Inc., Blacksburg Virginia (1996). *GASP Version 3 Users Manual.*

Agarwal, R. K. and Yun, K. Y. (2002). Burnett equations for simulation of transitional flows. *Appl. Mech. Rev.*, 55(3):219–240.

Agarwal, R. K., Yun, K. Y., and Balakrishnan, R. (2001). Beyond Navier-Stokes: Burnett equations for flows in the continuum-transition regime. *Phys. Fluids*, 13(10):3061–2085.

Ahmed, I. and Beskok, A. (2002). Rarefaction, compressibility, and viscous heating in gas microfilters. *AIAA J. Thermophys. Heat Transfer*, 16(2):161–170.

Aktas, O. and Aluru, N. R. (2002). A combined continuum/DSMC technique for multiscale analysis of microfluidic filters. *J. Comp. Phys.*, 178(2):342–372.

Aktas, O., Aluru, N. R., and Ravaioli, U. (2001). Application of a parallel DSMC technique to predict flow characteristics in microfluidic filters. *J. Microelectromech. Sys.*, 10(4):538–549.

Aktas, O., Ravaioli, U., and Aluru, N. R. (2003). A coupled DSMC/Navier-Stokes method for multiscale analysis of gas flow in microfluidic systems. *AIP Conference Proceedings*, 663(1):824–830.

Alexander, F., Garcia, A. L., and Alder, B. J. (1994). Direct Simulation Monte Carlo for thin-film bearings. *Phys. Fluids*, vol. 6 (12):3854–3860.

Alexander, F. J., Garcia, A. L., and Alder, B. J. (1998). Cell size dependence of transport coefficients in stochastic particle algorithms. *Phys. Fluids*, 10 (6):1540–1542.

Allen, M. P. and Tildesley, D. J. (1994). *Computer Simulation of Liquids*. Clarendon Press, Oxford.

Allen, R., Hansen, J. P., and Meichionna, S. (2003). Molecular dynamics investigation of water permeation through nanopores. *J. Chem. Phys.*, 119:3905–3919.

Allen, R., Melchionna, S., and Hansen, J. P. (2002). Intermittent permeation of cylindrical nanopore by water. *Phys. Rev. Lett.*, 89:175502.

Allen, T. W., Kuyucak, S., and Chung, S.-H. (1999). The effect of hydrophobic and hydrophilic channel walls on the structure and diffusion of water and ions. *J. Chem. Phys.*, 111:7985–7999.

Aluru, N. R. (2000). A point collocation method based on reproducing kernel approximations. *Int. J. Num. Meth. Eng.*, 47:1083–1121.

Aluru, N. R. and Li, G. (2001). Finite cloud method: A true meshless technique based on a fixed reproducing kernel approximation. *Int. J. Num. Meth. Eng.*, 50(10):2373–2410.

Ameel, T. A., Wang, X., Barron, R. F., and Warrington, R. O. (1997). Laminar forced convection in a circular tube with constant heat flux and slip flow. *J. Heat Transfer*, 124:346–355.

Ananthasuresh, G. K., Gupta, R. K., and Senturia, S. D. (1996). An approach to macromodeling of MEMS for nonlinear dynamic simulation. In *ASME-MEMS, DSC-Vol. 59*, pages 401–407.

Andersen, H. C. (1980). Molecular dynamics at constant pressure and/or temperature. *J. Chem. Phys.*, 72:2384–2393.

Andrienko, D., Dunweg, B., and Vinogradova, O. I. (2003). Boundary slip as a result of prewetting transition. *J. Chem. Phys.*, 119(24):13106–13112.

Ansumali, S. (2004). *Minimal kinetic modeling of hydrodynamics*. PhD thesis, Swiss Federal Institute of Technology Zurich.

Ansumali, S. and Karlin, I. V. (2002). Kinetic boundary conditions in the lattice Boltzmann equation. *Phys. Rev. E*, 66:026311.

Ansumali, S., Karlin, I. V., and Ottinger, H. C. (2003). Minimal entropic kinetic models for hydrodynamics. *Europhys. Lett.*, 63:798–804.

Aoki, K. (1989). Numerical analysis of rarefied gas flows by finite-difference method. *Rarefied Gas Dynamics: Theoretical and Computational Techniques, Edited by E.P. Muntz, D.P. Weaver, and D. H. Campbell*, pages 297–322.

Aoki, K. (2001). Dynamics of rarefied flows: Asymptotic and numerical analyses of the Boltzmann equation. In *Paper AIAA 2001-0874, 39th Aerospace Sciences Meeting & Exhibit, January 8-11, Reno, NV*.

Aoki, K., Sone, Y., and Masukawa, N. (1995). A rarefied gas flow induced by a temperature field. In Lord, J. H. . G., editor, *Proceedings of the Ninenteenth International Symposium on Rarefied Gas Dynamics*, Oxford University Press, Oxford U.K.

Aref, H. (1984). Stirring by chaotic advection. *J. Fluid Mech.*, 143:1–21.

Arkilic, E. (1997). *Measurement of the mass flow and tangential momentum accomodation coefficient in silicon micro-machined channels*. PhD thesis, Massachusetts Institute of Technology.

Arkilic, E. and Breuer, K. (1993). Gaseous flow in small channels. In *AIAA Shear Flow Conference July 6-9, 1992, Orlando FL, AIAA 93-3270*.

Arkilic, E., Breuer, K., and Schmidt, M. A. (2001). Mass flow tangential momentum accommodation in silicon micromachined channels. *J. Fluid Mech.*, 437:29–43.

Arkilic, E., Breuer, K., and Schmidt, M. A. (ASME 1994). Gaseous flow in microchannels. In *FED-Vol. 197, Application of Microfabrication to Fluid Mechanics*, pages 57–66.

Arkilic, E., Schmidt, M. A., and Breuer, K. (1997). Gaseous slip flow in long microchannels. *J. Microelectromech. Sys.*, 6(2):167–178.

Arya, G., Maginn, E. J., and Chang, H.-C. (2000). Efficient viscosity estimation from molecular dynamics simulation via momentum impulse relaxation. *J. Chem. Phys.*, 113:2079–2087.

Atluri, S. N. (2002). *The Meshless Local Petrov-Galerkin (MLPG) Method*. Tech Science Press.

Avgustinik, A. I., Vigdergauz, V. S., and Zharavlev, G. I. (1962). Electrophoretic deposition of ceramic masses from suspension and calculation of deposit yields. *J. Appl. Chem. USSR.*, 35:2175–2180.

Bahukudumbi, P. and Beskok, A. (2003). A phenomenological lubrication model for the entire Knudsen regime. *J. Micromech. Microeng.*, 13 (6):873–884.

Bahukudumbi, P., Park, J. H., and Beskok, A. (2003). A unified engineering model for steady and quasi-steady shear driven gas micro flows. *Microscale Thermophys. Eng.*, 7,(4):291–315.

Bai, Z. (2002). Krylov subspace techniques for reduced-order modeling of large-scale dynamical systems. *Applied Numerical Mathematics*, 43:9–44.

Baidya, B. and Mukherjee, T. (2002). Extraction and LVS for mixed-domain integrated MEMS layouts. In *Proceedings of ICCAD*, pages 361–366.

Balakrishnan, R. (2004). An approach to entropy consistency in second-order hydrodynamic equations. *J. Fluid Mech.*, 503:201–245.

Balakrishnan, R., Agarwal, R. K., and Yun, K. Y. (1999). BGK-Burnett equations for flows in the continuum-transition regime. *J. Thermophys. Heat Transfer*, 13:(4):397–410.

Ball, K. S., Sirovich, L., and Keefe, L. R. (1991). Dynamical eigenfunction decomposition of turbulent channel flow. *Int. J. Num. Meth. Fluids*, 12:585.

Bangia, A. K., Batcho, P. F., Kevrekidis, I. G., and Karniadakis, G. E. (1997). Unsteady two-dimensional flows in complex geometries: Comparative bifurcation studies with global eigenfunction expansions. *SIAM J. Sci. Comput.*, 18:775–805.

Barber, R. W. and Emerson, D. R. (2002). Numerical simulation of low Reynolds number slip flow past a confined microsphere. In *Proceedings of the Twenty Third International Symposium on Rarefied Gas Dynamics*.

Barber, R. W. and Emerson, D. R. (2004). Simulation of low Knudsen number isothermal flow past a confiend spherical particle in a micro-pipe. In *Microchannels and Minichannels, ASME*.

Bardos, C., Golse, F., and Levermore, C. D. (1991). Fluid dynamic limit of kinetic equations. I. Formal derivations. *J. Statist. Phys.*, 63(1-2):323–344.

Bardos, C., Golse, F., and Levermore, C. D. (1993). Fluid dynamic limit of kinetic equations. II. Convergence proofs for the Boltzmann equation. *Comm. Pure Appl. Math.*, 46(5):667–753.

Barker, S. L., Ross, D., Tarlov, M. J., Gaitan, M., and Locasio, L. E. (2000). Control of flow direction in microfluidic devices with polyelectrolyte multilayers. *Anal. Chem.*, 72(24):5925–5929.

Barragan, V. M. and Bauza, C. R. (2000). Electroosmosis through a cation-exchange membrane: Effect of an AC perturbation on the electroosmotic flow. *J. Colloid Interface Sci.*, 230:359–366.

Barrat, J.-L. and Bocquet, L. (1999). Large slip effect at a nonwetting fluid-solid interface. *Phys. Rev. Lett.*, 82(23):4671–4674.

Batchelor, G. (1976). Brownian diffusion of particles with hydrodynamic interaction. *J. Fluid Mech.*, 74:1–29.

Batchelor, G. (1998). *An Introduction to Fluid Dynamics*. Cambridge University Press, New York.

Bau, H. H. and Pfahler, J. N. (2001). Experimental observations of liquid flow in micro conduits. In *Paper AIAA 2001-0722, 39th Aerospace Sciences Meeting & Exhibit, January 8-11, Reno, NV*.

Bau, H. H., Zhong, J., and Yi, M. (2001). A minute magneto hydro dynamic (MHD) mixer. *Sens. Actuators, B*, 79:207–215.

Baudry, J., Charlaix, E., Tonck, A., and Mazuyer, D. (2001). Experimental evidence for a large slip effect at a nonwetting fluid-solid interface. *Langmuir*, 17:5232–5236.

Baughman, R. H., Zakhidov, A. A., and de Heer, W. A. (2002). Carbon nanotubes - the route toward applications. *Science*, 297:787–792.

Baygents, J. C., Schwarz, B. C., Deshmukh, R. R., and Brier, M. (1997). Recycling electrophoretic separations: modeling of isotachophoresis and isoelectric focusing. *J. Chromatogr. A*, pages 165–183.

Bayley, H. and Cremer, P. S. (2001). Stochastic sensors inspired by biology. *Nature*, 413:226–230.

Bayt, R. L. (1999). *Analysis, fabrication and testing of a MEMS-based micropropulsion system*. PhD thesis, Massachusetts Institute of Technology.

Bayt, R. L. and Breuer, K. (2000). *Fabrication and testing of micron-sized cold gas thrusters*, volume 187 of *Progress in Astronautics and Aeronautics*, pages 381–398. AIAA.

Becker, H. and Locascio, L. E. (2002). Polymer microfluidic devices. *Talanta*, 56:267–287.

Beckstein, O., Biggin, P. C., and Sansom, M. S. (2001). A hydrophobic gating mechanism for nanopores. *J. Phys. Chem. B*, 105:12902–12905.

Beckstein, O. and Sansom, M. S. (2003). Liquid-vapor oscillations of water in hydrophobic nanopores. *Proc. Natl. Acad. Sci.*, 100:7063–7068.

Belytschko, T., Krongauz, Y., Organ, D., Fleming, M., and Krysl, P. (1996). Meshless methods: An overview and recent developments. *Comput. Methods Appl. Mech. Engrg.*, 139:3–47.

Belytschko, T., Lu, Y. Y., and Gu, L. (1994). Element free Galerkin methods. *Int. J. Num. Meth. Eng.*, 37:229–256.

Beni, G., Hackwood, S., and Jackel, J. L. (1982). Continuous electrowetting effect. *Appl. Phys. Lett.*, 40(10):912–914.

Berendsen, H. J., Grigera, J. R., and Straatsma, T. P. (1987). The missing term in effective pair potentials. *J. Phys. Chem.*, 91:6269–6271.

Berendsen, H. J. C., Postma, J. P. M., van Gunsteren, W. F., DiNola, A., and Haak, J. R. (1984). Molecular dynamics with coupling to an external bath. *J. Chem. Phys.*, 81:3684–3690.

Berezhkovskii, A. and Hummer, G. (2002). Single-file transport of water molecules through a carbon nanotube. *Phys. Rev. Lett.*, 89:064503.

Berkooz, G., Holmes, P., and Lumley, J. L. (1993). The proper orthogonal decomposition in the analysis of turbulent flows. *Ann. Rev. Fluid Mech.*, 25:537.

Beskok, A. (2001). Validation of a new slip model for separated gas micro-flows. *Num. Heat Transfer: Fundamentals*, 40(6):451–471.

Beskok, A. and Karniadakis, G. E. (1992). Simulation of slip-flows in complex micro-geometries. *ASME*, DSC-Vol. 40:pp. 355–370.

Beskok, A. and Karniadakis, G. E. (1994). Simulation of heat and momentum transfer in complex microgeometries. *AIAA J. Thermophys. Heat Transfer*, 8 (4):647–655.

Beskok, A. and Karniadakis, G. E. (1999). A model for flows in channels, pipes and ducts at micro and nano scales. *Microscale Thermophys. Eng.*, 3(1):43–77.

Beskok, A., Trimmer, W., and Karniadakis, G. E. (1995). Rarefaction compressibility and thermal creep effects in gas microflows. *IMECE 95, Proceedings of the ASME Dynamic Systems and Control Division*, DSC-Vol. 57-2:877–892.

Beskok, A. and Warburton, T. (2001). An unstructured h/p finite element scheme for fluid flow and heat transfer in moving domains. *J. of Comp. Phys.*, 174:492–509.

Bevan, M. A. and Prieve, D. C. (2000). Hindered diffusion of colloidal particles very near to a wall: Revisited. *J. Chem. Phys.*, 113(3):1228–1236.

Bharadwaj, R., Santiago, J. G., and Mohammadi, B. (2002). Design and optimization of on-chip capillary electrophoresis. *Electrophoresis*, 23:2729–2744.

Bhatnagar, P. L., Gross, E. P., and Krook, K. (1954). A model for collision processes in gasses. *Phys. Rev.*, 94:511–524.

Bhatt, K. H. and Velev, O. D. (2004). Control and modeling of the dielectrophoretic assembly of on-chip nanoparticle wires. *Langmuir*, 20:467–476.

Bianchi, F., Ferrigno, R., and Girault, H. H. (2000). Finite element simulation of an electroosmotic-driven flow division at a T-junction of microscale dimension. *Anal. Chem.*, 72(9):1987–1993.

Biesheuvel, P. M. and Verweij, H. (1999). Theory of cast formation in electrophoretic deposition. *Journal of the American Ceramic Society*, 82:1451–1455.

Bird, G. (1978). Monte Carlo simulation of gas flows. *Ann. Rev. Fluid Mech.*, 10:11–31.

Bird, G. (1994). *Molecular Gas Dynamics and Direct Simulation of Gas Flows*. Oxford University Press, Oxford.

Bitsanis, I., Magda, J. J., Tirell, M., and Davis, H. T. (1987). Molecular dynamics of flow in micropores. *J. Chem. Phys.*, 87(3):1733–1750.

Bitsanis, I., Somers, S. A., Davis, H. T., and Tirell, M. (1990). Microscopic dynamics of flow in molecular narrow pores. *J. Chem. Phys.*, 93(5):3427–3431.

Bitsanis, I., Vanderlick, T. K., Tirell, M., and Davis, H. T. (1988). A tractable molecular theory of flow in strongly inhomogeneous fluids. *J. Chem. Phys.*, 89(5):3152–3162.

Blake, T. D. (1990). Slip between a liquid and a solid: D.M. Tolstoi's (1952) theory reconsidered. *Colloids Surf.*, 47:135–145.

Blech, J. J. (1983). On isothermal squeeze films. *J. Lubrication Technol.*, 105:615–620.

Bobetic, M. V. and Barker, J. A. (1970). Lattice dynamics with three-body forces: argon. *Phys. Rev. B*, 2:4169–4175.

Bocquet, L. and Barrat, J.-L. (1993). Hydrodynamic boundary-conditions and correlation-functions of confined fluids. *Phys. Rev. Lett.*, 70(18).

Bocquet, L. and Barrat, J.-L. (1994). Hydrodynamic boundary-conditions, correlation-functions and Kubo relations for confined fluids. *Phys. Rev. E*, 49(4).

Boghosian, B. M., Love, P. J., Coveney, P. V., Karlin, I. V., Succi, S., and Yepez, J. (2003). Galilean-invariant lattice- Boltzmann models with H-theorem. *Phys. Rev. E Rapid Communications*, 68(2):025103.

Boghosian, B. M., Love, P. J., Yepez, J., and Coveney, P. (2004). Galilean-invariant multi-speed entropic lattice Boltzmann models. *Phys. D*, 193:169–181.

Bohmer, M. (1996). In situ observation of 2-dimensional clustering during electrophoretic deposition. *Langmuir*, 12:5747–5750.

Bonaccurso, E., Butt, H.-J., and Craig, V. (2003). Surface roughness and hydrodynamic boundary slip of a Newtonian fluid in a completely wetting system. *Phys. Rev. Lett.*, 90(14):144501.

Bonaccurso, E., Kappl, M., and Butt, H.-J. (2002). Hydrodynamic force measurements: Boundary slip of water on hydrophilic surfaces and electrokinetic effects. *Phys. Rev. Lett.*, 88(7):076103.

Born, M. and Mayer, J. E. (1932). Zur gittertheorie der ionenkristalle. *Z. Physik*, 75:1–18.

Borukhov, I., Andelman, D., and Orland, H. (2000). Adsorption of large ions from an electrolyte solution: a modified Poisson-Boltzmann equation. *Electrochimi. Acta*, 46:221–229.

Bottausci, F., Mezic, I., Meinhart, C. D., and Gardonne, C. (2004). Mixing in the shear superposition micromixer: three-dimensional analysis. *Phil. Trans. R. Soc. London, Ser. A*, 362:1001–1018.

Boyd, I. D. and Sun, Q. (2001). Particle simulation of micro-scale gas flows. In *AIAA 2001-0876, 39th Aerospace Sciences Meeting & Exhibit, January 8-11, Reno, NV*.

Brady, J. F. and Bossis, G. (1988). Stokesian Dynamics. *Ann. Rev. Fluid Mech.*, 20:111–157.

Brakke, K. (1992). The surface evolver. *Exp. Math.*, 1(2):141–165.

Bretherton, F. P. (1961). The motion of long bubbles in tubes. *J. Fluid Mech.*, 10(2):166–188.

Breuer, K., Piekos, E. S., and Gonzales, A. D. (1995). DSMC simulations of continuum flows. In *AIAA Thermophysics Conference, June 19-22 1995, San Diego, CA, AIAA 95-2088*.

Brodman, C. (1891). Untersuchungen ueber Reibungkoeffizienten au Fuessigkeiten. *Dissertation, Goettingen*.

Brovchenko, I. V., Geiger, A., and Paschek, D. (2001). Simulation of confined water in equilibrium with a bulk reservoir. *Fluid Phase Equilibria*, 183:331–339.

Brown, H. S., Jolly, M. S., Kevrekidis, I. G., and Titi, E. S. (1990). *Use of approximate inertial manifolds in bifurcation calculations. In: D. Roose, et. al., (Eds), Continuation and bifurcations: Numerical techniques and applications*. Kluwer Academic Press.

Bryzek, J., Petersen, K., and McCulley, W. (1994). Micromachines on the march,. *IEEE Spectrum*, 31(5):20–31.

Buch, J. S., Wang, P. C., DeVoe, D. L., and Lee, S. L. (2001). Field-effect flow control in a polydimethylsiloxane-based microfluidic system. *Electrophoresis*, 22:3902–3907.

Bultheel, A. and Barvel, M. V. (1986). Padè techniques for model reduction in linear system theory: A survey. *J. Comput. Appl. Math. Phys.*, 14:401–438.

Bungay, P. M. and Brenner, H. (1973). The motion of a closely-fitting sphere in a fluid-filled tube. *Int. J. Multiphase Flow*, 1:25–56.

Burak, Y. and Andelman, D. (2001). Discrete aqueous solvent effects and possible attractive forces. *J. Chem. Phys.*, 114(7):3271–3283.

Burgdorfer, A. (1959). The influence of the molecular mean free path on the performance of hydrodynamic gas lubricated bearings. *J. Basic Eng. Trans. ASME*, 81:94–99.

Burgreen, D. and Nakache, F. R. (1964). Eletrokinetic flow in ultrafine capillary silts. *J. Phys. Chem.*, 68(5):1084–1091.

Cabrera, C. R., Finlayson, B., and Yager, P. (2001). Formation of natural pH gradients in a microfluidic device under flow conditions: Model and experimental validation. *Anal. Chem.*, 73(3):658–666.

Cadence, Ltd. (1997). *SpectreHDL Reference Manual*.

Cai, C., Boyd, I. D., and Fan, J. (2000). Direct simulation methods for low-speed microchannel flows. *J. Thermophys. Heat Transfer*, 14(3):368–378.

Carrier, J., Greengard, L., and Rokhlin, V. (1988). A fast adaptive multipole algorithm for particle simulations. *SIAM J. Sci. Stat. Comput.*, 9:669–686.

Casinovi, G. (2002). Coupled-energy-domain macromodeling of MEMS devices. In *Modeling and Simulation of Microsystems*, pages 158–161.

Cercignani, C. (1963). Plane Poiseuille flow and Knudsen minimum effect. In Laurmann, J. A., editor, *Proceedings of the Third International Symposium on Rarefied Gas Dynamics*, volume 1, pages 92–101, New York. Academic Press.

Cercignani, C. (1975). *Theory and Application of the Boltzmann equation*. Scottish Academic Press.

Cercignani, C. (1988). *The Boltzmann Equation and its Applications*. Springer, New York.

Cercignani, C. (2000). *Rarefied Gas Dynamics: From Basic Concepts to Actual Calculations*. Cambridge University Press, New York.

Cercignani, C. and Daneri, A. (1963). Flow of a rarefied gas between two parallel plates. *J. Appl. Phys.*, 43.

Cercignani, C., Illner, R., and Pulvirenti, M. (1994). *The Mathematical Theory of Dilute Gases*. Springer-Verlag, New York.

Cercignani, C. and Lampis, M. (1971). Kinetic models for gas-surface interactions. *Transport Theory and Stat. Phys.*, 1:101–114.

Cercignani, C. and Sernagiotto, F. (1966). Cylindrical Poiseuille flow of a rarefied gas. *Phys. Fluids*, 9 (1):40.

Chan, D. Y. and Horn, R. G. (1985). The drainage of thin liquid films between solid surfaces. *J. Chem. Phys.*, 83(10):5311–5324.

Chan, H. B., Aksyuk, V. A., Kleiman, R. N., Bishop, D. J., and Capasso, F. (2001). Quantum mechanical actuation of microelectromechanical systems by the Casimir force. *Science*, 291:1941–1944.

Chan, W. K. and Sun, Y. (2003). Analytic modeling of ultra-thin-film bearings. *J. Micromech. Microeng.*, 13:463–473.

Chaplin, M. (2004). http://www.lsbu.ac.uk/water/.

Chapman, S. and Cowling, T. G. (1970). *The Mathematical Theory of Non-Uniform Gases; An account of the kinetic theory of viscosity, thermal conduction and diffusion in gases*. Cambridge University Press.

Chen, C. H., Lin, H., Lele, S. K., and Santiago, J. G. (2003). Electrokinetic microflow instability with conductivity gradients. In *µTAS2003, Squaw Valley, CA*.

Chen, C. H. and Santiago, J. G. (2002). Electrokinetic instability in high concentration gradient microflows. In *IMECE-2002, New Orleans, LA*, pages CD Vol.1, No 33563.

Chen, C. S. and Kuo, W. J. (2003). Squeeze and viscous dampings in micro electrostatic comb drives. *Sens. Actuators, A*, 107:193–203.

Chen, G. and Boyd, I. (1996). Statistical error analysis for the direct simulation Monte Carlo technique. *J. Comp. Phys.*, 126:434–448.

Chen, J. and Kang, S. M. (2001a). Dynamic macromodeling of MEMS mirror devices. In *Proceedings of IEDM*, pages 925–928.

Chen, J. and Kang, S. M. (2001b). Model-order reduction of nonlinear MEMS devices through arc-length-based Karhunen-Loève decomposition. In *Proceedings of ISCAS*, pages 457–460.

Chen, R., Zhang, Y., Wang, D., and Dai, H. (2001). Noncovalent sidewall functionalization of single-walled carbon nanotubes for protein immobilization. *J. Am. Chem. Soc.*, 123(16):3838–3839.

Chen, R., Zitter, R. N., and Tao, R. (1992). Laser-diffraction determination of the crystalline structure of an electrorheological fluid. *Phys. Rev. Lett.*, 68:2555.

Chen, S. and Doolen, G. D. (1998). Lattice Boltzmann method for fluid flows. *Ann. Rev. Fluid Mech.*, 30:329.

Chen, S., Martinez, D., and Mei, R. (1996). On boundary conditions in lattice Boltzmann methods. *Phys. Fluids*, 8:2527–2536.

Chen, X. and Xu, B. (2002). The Nusselt number and friction factor at the entrance of a micro-duct. *Int. Comm. Heat and Mass Transfer*, 29(6):763–772.

Chen, Y., Haddon, R., Fang, S., Rao, A., Eklund, P., Lee, W., Dickey, E., Grulke, E., Pendergrass, J., Chavan, A., Haley, B., and Smalley, R. (1998). Chemical attachment of organic functional groups to single-walled carbon nanotube material. *J. Mater. Res.*, 13(9):2423–2431.

Chen, Y. and White, J. (2000). A quadratic method for nonlinear model order reduction. In *Modeling and Simulation of Microsystems*, pages 477–480.

Cheng, H. K. and Emmanuel, G. (1995). Perspectives on hypersonic nonequilibrium flow. *AIAA J.*, 33:385–400.

Cheng, J., Sheldon, E., Wu, L., Uribe, A., Gerrue, L., Carrino, J. Heller, M., and O'Connell, J. (1998). Preparation and hybridization analysis of DNA/RNA from E-coli on microfabricated bioelectronic chips. *Nat. Biotechnol.*, 16:541–546.

Cheng, J.-T. and Giordano, N. (2002). Fluid flow through nanometer-scale channels. *Phys. Rev. E*, 65:031206.

Cheng, L., Fenter, P., Nagy, K. L., Schlegel, M. L., and Sturchio, N. C. (2001). Molecular-scale density oscillations in water adjacent to a mica surface. *Phys. Rev. Lett.*, 87(15):156103.

Chiou, P. Y., Moon, H., Toshiyoshi, H., Kim, C.-J., and Wu, M. C. (2003). Light actuation of liquid by optoelectrowetting. *Sens. Actuators, A*, 104:222–228.

Cho, S. K., Moon, H., and Kim, C.-J. (2003). Creating, transporting, cutting, and merging liquid droplets by electrowetting-based actuation for digital microfluidic circuits. *J. Microelectromech. Sys.*, 12(1):70–79.

Choi, C.-H., Westin, J., and Breuer, K. (2003). Apparent slip flows in hydrophilic and hydrophobic microchannels. *Phys. Fluids*, 15(10):2897–2902.

Chu, W. H., Chin, R. C., and Huen, T. (1999). Silicon membrane nanofilters from sacrificial oxide removal. *J. Microelectromech. Sys.*, 8(1):34–42.

Chuarev, N. V., Sobolev, V. D., and Somov, A. N. (1984). Slippage of liquids over lyophobic solid surfaces. *J. Colloid Interface Sci.*, 97:574–581.

Cieplak, M., Koplik, J., and Banavar, J. R. (2001). Boundary conditions at fluid-solid interface. *Phys. Rev. Lett.*, 86(5):803–806.

Clift, R., Grace, J. R., and Weber, M. E. (1978). *Bubbles, Drops, and Particles*. Academic Press, New York.

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

Cockburn, B., Karniadakis, G. E., and Shu, C.-W. (2000). *Discontinuous Galerkin methods: Theory, computation and applications*. Springer-Verlag, Heidelberg.

Colin, S., LaLonde, P., and Caen, R. (2004). Validation of a second-order slip flow model in rectangular microchannels. *Heat Transfer Engineering*, 25(3):23–30.

Conlisk, A. T., McFerran, J., Zheng, Z., and Hansford, D. (2002). Mass transfer and flow in electrically charged micro- and nanochannels. *Anal. Chem.*, 74:2139–2150.

Craig, V., Neto, C., and Williams, D. (2001). Shear-dependent boundary slip in an aqueous Newtonian liquid. *Phys. Rev. Lett.*, 87(5):054504.

Craighead, H. G. (2000). Nanoelectromechanical systems. *Science*, 290:1532–1535.

Crocker, J. C. and Grier, D. G. (1996). Methods of digital video microscopy for colloidal studies. *J. Colloid Interface Sci.*, 179:298–310.

Culbertson, C. T., Ramsey, R. S., and Ramsey, J. M. (2000). Electroosmotically induced hydraulic pumping on microchips: Differential ion transport. *Anal. Chem.*, 72(10):2285–2291.

Cummings, E. B. (2001). Ideal electrokinesis and dielectrophoresis in arrays of insulating posts. In *AIAA, AIAA2001-1163*, pages 1–10.

Cummings, E. B., Griffiths, S. K., and Nilson, R. H. (1999). Irrotationality of uniform electroosmosis. In *Proc. SPIE Microfluidic Devices and Systems II*, pages 180–189.

Cummings, E. B., Griffiths, S. K., Nilson, R. H., and Paul, P. H. (2000). Conditions for similitude between the fluid velocity and electric field in electroosmotic flow. *Anal. Chem.*, 72(11):2526–2532.

Cummings, E. B. and Singh, A. K. (2000). Dielectrophoretic trapping without embedded electrodes. In *Proc. of SPIE Conferences on Micromachining and Microfabrication*, pages 164–173.

da Silva, M. G., Greiner, K., Liu, C. H., Kenny, T. W., and Gilbert, J. R. (1999). Squeeze film damping effects in a micromachined tunneling accelerometer. In *Proceedings of 1999 ASME IMECE Meeting MEMS-Vol 1*, pages 87–92, Nashville, TN.

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

Darden, T., York, D., and Pedersen, L. (1993). Particle mesh Ewald: An N-log(N) method for Ewald sums in large systems. *J. Chem. Phys.*, 98:10089–10092.

Darhuber, A. A., Davis, J. M., Troian, S. M., and Reisner, W. (2003). Thermocapillary actuation of liquid flow on chemically patterned surfaces. *Phys. of Fluids*, 15(5):1295–1304.

Darhuber, A. A., Troian, S. M., Miller, S. M., and Wagner, S. (2000). Morphology of liquid microstructures on chemically patterned surfaces. *J. Appl. Phys.*, 87(11):7768–7775.

Darhuber, A. A., Troian, S. M., and Reisner, W. W. (2001). Dynamics of capillary spreading along hydrophilic microstipes. *Phys. Rev. E*, 64:031603–1 031603–8.

Davies, J. T. and Rideal, E. K. (1966). *Interfacial Phenomena*. Academic Press Inc.: London.

Davis, J. M. and Troian, S. M. (2003). Influence of attractive van der Waals interactions on the optimal excitations in thermocapilary-driven spreading. *Phys. Rev. E*, 67:016308–1 016308–9.

De Leeuw, S. W., Perram, J. W., and Smith, E. R. (1980). Simulation of electrostatic systems in periodic boundary conditions. I. Lattice sums and dielectric constant. *Proc. R. Soc. Lond.*, A373:27–56.

Deane, A., Kevrekidis, I. G., Karniadakis, G. E., and Orszag, S. A. (1991). Low-dimensional models for complex geometry flows: Application to grooved channels and circular cylinders. *Phys. Fluids*, 3(10):2337.

Debye, P. and Cleland, R. L. (1959). Flow of liquid hydrocarbons in porous Vycor. *J. Appl. Phys.*, 30:843–849.

DeGasperis, G., Yang, J., Becker, F. F., and Gascoyne, P. R. (1999). Microfluidic cell separation by two-dimensional dielectrophoresis. *Biomed. Microdevices*, 2:1:41–49.

deGennes, P. (1985). Wetting: Statics and dynamics. *Rev. Mod. Phys.*, 57:827–863.

deGennes, P. (2002). On fluid/wall slippage. *Langmuir*, 18:3413–3414.

deGennes, P., Brochard-Wyart, F., and Quere, D. (2004). *Capillarity and Wetting Phenomena*. Springer, New York.

Deissler, R. G. (1964). An analysis of second-order slip flow and temperature jump boundary conditions for rarefied gases. *Int. J. Heat Mass Transfer*, 7:681–694.

Dekker, C. (1999). Carbon nanotubes as molecular quantum wires. *Physics Today*, 52(5):22–28.

Dent, G. L. (1999). *Aspects of particle sedimentation in dilute flows at finite Reynolds numbers.* PhD thesis, Brown University.

Derbunovich, G. I., Zamskaya, A. S., Repik, Y. U., and Sosedko, Y. P. (1998). Hydraulic drag on perforated plates. *Fluid Mech.-Soviet Research*, 13:111–116.

Derjaguin, B. V. (1970). Superdense Water. *Scientific American*, 223 (5):52.

Derjaguin, B. V., Popovskif, Y. M., and Altoiz, B. A. (1983). Liquid-crystalline state of the wall-adjacent layers of some polar liquids. *J. Colloid Interface Sci.*, 96:492–503.

Deshmukh, A. A., Liepmann, D., and Pisano, A. P. (2000). Continuous micromixer with pulsatile micropumps. In *Solid-State Sensor and Actuator Workshop, Hilton Head Island, SC, USA, 4-8 June*, volume 73-6.

Desjardins, B., Grenier, E., Lions, P.-L., and Masmoudi, N. (1999). Incompressible limit for solutions of the isentropic Navier-Stokes equations with Dirichlet boundary conditions. *J. Math. Pures Appl.*, 78(5):461–471.

Deval, J., Tabeling, P., and Ho, C. H. (2002). A dielectrophoretic chaotic mixer. In *MEMS 2002, IEEE International Conference, Las Vegas, January 20-24*.

Dietrich, S. and Boyd, I. D. (1996). Scalar and parallel optimized implementation of the direct simulation Monte Carlo method. *J. Comp. Phys.*, 126:328–342.

Diez, J. A., Kondic, L., and Bertozzi, A. (2000). Global models for moving contact lines. *Phys. Rev. E*, 63:011208–1 011208–13.

Digilov, R. (2000). Charge-induced modification of contact angle: The secondary electrocapillary effect. *Langmuir*, 16:6719–6723.

Dinsmore, A. D., Hsu, M. F., Nicolaides, M. G., Marquez, M., Bausch, A. R., and Weitz, D. A. (2002). Colloidosomes: Selectively permeable capsules composed of colloidal particles. *Science*, 298:1006–1009.

DiPerna, R. J. and Lions, P.-L. (1991). Global solutions of Boltzmann's equation and the entropy inequality. *Arch. Rational Mech. Anal.*, 114(1):47–55.

Donea, J., Giuliani, S., and Halleux, J. P. (1982). An arbitrary Lagrangian-Eulerian finite element method for transient dynamic fluid-structure interactions. *Comput. Methods Appl. Mech. Eng.*, 33:689.

Dong, S., Liu, D., Maxey, M. R., and Karniadakis, G. E. (2004). Spectral distributed multiplier (DLM) method: Algorithm and benchmark tests. *J. Comp. Phys.*, 195:695–717.

D'Orazio, F., Bhattacharja, S., Halperin, W. P., and Gerhardt, R. (1989). Enhances self-diffusion of water in restricted geometry. *Phys. Rev. Lett.*, 63:43–46.

Dose, E. V. and Guiochon, G. (1993). Time scales of transient processes in capillary electrophoresis. *J. Chromatogr.*, 652:263–275.

Doyle, D., Cabral, J., Pfuetzner, R., an J. Gulbis, A. K., Cohen, S., Chait, B., and MacKinnon, R. (1998). The structure of the potassium channel. Molecular basis of K-conduction and selectivity. *Science*, 280:69–77.

Doyle, P. S., Bibette, J., Bancaud, A., and Viory, J.-L. (2002). Self-assembled magnetic matrices for DNA separation chips. *Science*, 295:2237.

Dozier, W. D., Drake, J. M., and Klafter, J. (1986). Self-diffusion of a molecule in porous vycor glass. *Phys. Rev. Lett.*, 56:197–200.

Drazer, G., Koplik, J., Acrivos, A., and Khusid, B. (2002). Adsorption phenomena in the transport of a colloidal particle through a nanochannel containing a partially wetting fluid. *Phys. Rev. Lett.*, 89:244501.

Duh, D. and Mier-Y-Teran, L. (1997). An analytical equation of state for the hard-core Yukawa fluid. *Mol. Phys.*, 90:373–379.

Dussan, E. (1979). On the spreading of liquids on solid surfaces: Static and dynamic contact lines. *Annu. Rev. Fluid Mech.*, 11:371–400.

Dutta, D. and Leighton, D. T. (2001). Dispersion reduction in pressure-driven flow through microetched channels. *Anal. Chem.*, 73:504–513.

Dutta, D. and Leighton, D. T. (2002). A low dispersion geometry for microchip separation devices. *Anal. Chem.*, 74:1007–1016.

Dutta, D. and Leighton, D. T. (2003). Dispersion in large aspect ratio microchannels for open-channel liquid chromatography. *Anal. Chem.*, 75:57–70.

Dutta, P. and Beskok, A. (2001a). Analytical solution of combined electroosmotic/pressure driven flows in two-dimensional straight channels: Finite Debye layer effects. *Anal. Chem.*, 73(9):1979–1986.

Dutta, P. and Beskok, A. (2001b). Analytical solution of time periodic electroosmotic flows: Analogies to Stokes' second problem. *Anal. Chem.*, 73(21):5097–5102.

Dutta, P., Beskok, A., and Warburton, T. (2002a). Electroosmotic flow control in complex microgeometries. *J. Microelectromech. Sys.*, 11(1):36–44.

Dutta, P., Beskok, A., and Warburton, T. (2002b). Numerical simulation of mixed electroosmotic/pressure driven microflows. *Numer. Heat Transfer, Part-A: Applications*, 41(2):131–148.

Ebert, H. and Albrand, K. R. (1963). The applicability of gas flows in the molecular range. *Vacuum*, 13:563.

Egorov, A. and Brodskaya, E. (2003). The effect of ions on solid-liquid phase transition in small water clusters. A molecular dynamics study. *J. Chem. Phys.*, 118:6380–6386.

Ehrfeld, W. (2003). Electrochemistry and microsystems. *Electrochimica Acta*, 48:2857–2868.

Eikerling, M. and Kornyshev, A. (2001). Proton transfer in a single pore of a polymer electrolyte membrane. *J. Electroana. Chem.*, 502.

Elrod, M. J. and Saykally, R. (1994). Many body effects in intermolecular forces. *Chem. Rev.*, 94:1975–1997.

Engl, W. L., Laur, R., and Dirks, H. K. (1982). MEDUSA–A simulator for modular circuits. *IEEE Transactions on Computer-Aided Design of Integrated Circuits*, 1:85–93.

Erickson, D. and Li, D. (2002). Influence of surface heterogeneity on electrokinetically driven microfluidic mixing. *Langmuir*, 18(5):1883–1893.

Ermakov, S. V., Bello, M. S., and Righetti, P. G. (1994). Numerical algorithms for capillary electrophoresis. *J. Chromatogr. A*, 661:265–278.

Ermakov, S. V., Jacobson, S. C., and Ramsey, J. M. (1998). Computer simulation of electrokinetic transport in micro fabricated channel structures. *Anal. Chem.*, 70(21):4494–4504.

Ermakov, S. V., Jacobson, S. C., and Ramsey, J. M. (1999). Computer simulation of electrokinetic mass transport in microfabricated fluidic devices. In *Proc. of Modeling and Simulation of Microsystems*, pages 534–537.

Ermakov, S. V., Jacobson, S. C., and Ramsey, J. M. (2000). Computer simulations of electrokinetic injection techniques in microfluidic devices. *Anal. Chem.*, 72(15):3512–3517.

Ermakov, S. V., Mazhorova, O. S., and Popov, Y. P. (1992). Mathematical modeling of the electrophoretic separation of biological mixtures. *Translated from Differentsial'nye Uravneniya*, 12:2129–2137.

Espanol, P. (1995). Hydrodynamics for dissipative particle dynamics. *Phys. Rev. E*, 52:1734.

Espanol, P. and Warren, P. (1995). Statistical mechanics of dissipative particle dynamics. *Europhys. Lett.*, 30(4):191–196.

Essmann, U., Perera, L., Berkowitz, M., Darden, T., Lee, H., and Pedersen, L. (1995). A smooth particle mesh Ewald potential. *J. Chem. Phys.*, 103:8577–8592.

Estrelalopis, V. R., Ulberg, Z. R., and Koniashvili, S. A. (1982). Mechanism of electrophoretic deposition of aqueous dispersions in a pulsed field. *Colloid Journal of the USSR*, 44:74–79.

Evans, D. J. and Morriss, G. P. (1990). *Statistical Mechanics of Non-Equilibrium liquids*. Academic Press, London.

Evans, J. D., Lipemann, D., and Pisano, A. P. (January 26-30, 1997). Planar laminar mixer. In *MEMS-97, The Tenth Annual International Workshop on MEMS*.

Fan, J. and Shen, C. (1999). Statistical simulation of low-speed unidirectional flows in transition regime. In *Rarefied Gas Dynamics, eds. Brun et al.*, volume 2, pages 245–252.

Fedder, G. K. and Jing, Q. (1998). Nodas 1.3 - nodal design of actuators and sensors. In *IEEE/VIUF Int. Workshop on Behavioral Modeling and Simulation*.

Feynman, R. P., Leighton, R. B., and Sands, M. (1977). *The Feynman Lectures on Physics*. Addison-Wesley, Massachusetts.

Fiedler, S., Shirley, S. Schnelle, T., and Fuhr, G. (1998). Dielectophoretic sorting of particles and cells in a microsystem. *Anal. Chem.*, 70:1909–1915.

Fischer, J. and Methfessel, M. (1980). Born-Green-Yvon approach to the local densities of a fluid at interfaces. *Phys. Rev. A*, 22(6):2836–2843.

Flekkoy, E. G., Wagner, G., and Feder, J. (2000). Hybrid model for combined particle and continuum dynamics. *Europhys. Lett.*, 52(3):271–276.

Fletcher, P. D., Haswell, S. J., and Paunov, V. N. (1999). Theoretical considerations of chemical reactions in micro-reactors under electroosmotic and electrophoretic control. *The Analyst*, 124:1273–1282.

Forrest, B. M. and Suter, U. W. (1995). Accelerated equilibration of polymer melts by time-coarse-graining. *J. Chem. Phys.*, 102(18):7256–7266.

Fortes, A. F., Joseph, D. D., and Lundgren, T. S. (1987). Nonlinear mechanics of fluidization of beds of spherical particles. *J. Fluid Mech.*, 177:467–483.

Freeman, D. M., Aranyosi, A. J., Gordon, M. J., and Hong, S. S. (1998). Multidimensional motion analysis of MEMS using computer microvision. In *Solid-State Sensor and Actuator Workshop, Hilton Head Is., S.C.*, pages 150–155.

Fremerey, J. K. (1982). Spinning rotor vacuum gauges. *Vacuum*, 32:685–690.

Fremerey, J. K. (1985). The spinning rotor gauge. *J. Vacuum Science Technology A*, 3(3):1715–1720.

Frenkel, D. and Smit, B. (2002). *Understanding Molecular Simulation*. Academic Press.

Freund, J. (2002). Electro-osmosis in a nanometer-scale channel studied by atomistic simulation. *J. Chem. Phys.*, 116(5):2194–2200.

Freund, R. W. (1999). Reduced order modeling techniques based on Krylov subspaces and their use in circuit simulations. *Applied and Computational Control, Signals and Circuits*, 1:435–498.

Frisch, U., Hasslacher, B., and Pomeau, Y. (1986). Lattice Gas Automaton for the Navier-Stokes equation. *Phys. Rev. Lett.*, 56:1505.

Fukui, S. and Kaneko, R. (1988). Analysis of ultra thin gas film lubrication based on linearized Boltzmann equation: First report - derivation of a generalized lubrication equation including thermal creep flow. *J. Tribology*, 110:253–262.

Fukui, S. and Kaneko, R. (1990). A database for interpolation of Poiseuille flow rates for high Knudsen number lubrication problems. *J. Tribology*, 112:78–83.

Furst, E. M. and Gast, A. P. (2000). Micromechanics of magnetorheological suspensions. *Phys. Rev. E*, 61(6):6732–6739.

Furst, E. M., Suzuki, C., Fermigier, M., and Gast, A. P. (1998). Aggregation kinetics of paramagnetic coloidal particles. *Langmuir*, 14:7334–7336.

Gabbay, L. and Senturia, S. D. (1998). Automatic generation of dynamic macromodels using quasi-static simulations in combination with modal analysis. In *Technical Digest: Solid State Sensors and Actuators Workshop*, pages 197–200.

Gabriel, K., Javris, J., and Trimmer, W. (1988). Small machines, large opportunities. Technical report, NSF.

Gad-el-Hak, M. (1999). The fluid mechanics of microdevices. *J. Fluids Eng.*, 12(1):5–33.

Gad-El-Hak, M. (2001). *Handbook of MEMS*. CRC Press.

Gaede, W. (1913). Die äubere reibung der gase. *Annalen der Physik*, 41:289.

Galle, J. and Vortler, H. (1999). Monte Carlo simulation of primitive water in slit-like pores: Networks and clusters. *Surf. Sci.*, 421:33–43.

Galle, J. and Vortler, H. (2001). Monte Carlo simulation of primitive water in planar slits with molecularly rough walls: Surface self-organization. *Surf. Sci.*, 481:39–53.

Gallo, P., Rapinesi, M., and Rovere, M. (2002a). Confined water in low hydration regime. *J. Chem. Phys.*, 117:369–375.

Gallo, P., Ricci, M. A., and Rovere, M. (2002b). Layer analysis of the structure of water confined in vycor glass. *J. Chem. Phys.*, 116:342–346.

Gallo, P., Rovere, M., Ricc, M. R., Harting, C., and Sphor, E. (1999). Evidence of glassy behavior of water molecules in confined states. *Philosophical Magazine*, 79:1923–1930.

Gallo, P., Rovere, M., and Spohr, E. (2000). Glass transition and layering effects in confined water: A computer simulation study. *J. Chem. Phys.*, 113:11324–11334.

Gampert, B. (1976). Inlet flow with slip. In *Proceedings of the Tenth International Symposium on Rarefied Gas Dynamics*, pages 225–235.

Gampert, B. (1978). Low Reynolds number TAC-slip flow past a circular cylinder. In *Proceedings of the Eleventh International Symposium on Rarefied Gas Dynamics*, pages 255–267.

Garcia, A. L., Bell, J. B., Crutchfield, W. Y., and Alder, B. J. (1999). Adaptive mesh and algorithm refinement using direct simulation Monte Carlo. *J. Comp. Phys.*, 154(1):134–155.

Garcia-Archilla, B., Novo, J., and Titi, E. S. (1998). Postprocessing the Galerkin method: A novel approach to approximate inertial manifold. *SIAM J. Numer. Anal.*, 35:941–972.

Gascoyne, P., Huang, Y., Pethig, R., Vykuokal, J., and Becker, F. (1992). Dielectrophoretic separation of mammalian-cells studied by computerized image-analysis. *Meas. Sci. and Tech*, 3:439–445.

Gascoyne, P. and Wang, X. (1997). Dielectrophoretic separation of cancer cells from blood. *IEEE Transactions on Industry Application*, 33(3):670–678.

Gast, A. P. and Zukoski, C. F. (1989). Electrorheological fluids as colloidal suspensions. *Adv. Col. Inter. Sci.*, 30:153.

Gatsonis, N. A., Nanson, R. A., and Le Beau, G. J. (2000). Simulations of cold-gas nozzle and plume flows and flight data comparisons. *Journal of Spacecraft and Rockets*, 37(1):39–48.

Gau, H., Herminghaus, S., Lenz, P., and Lipowsky, R. (1999). Liquid morphologies on structured surfaces: From microchannels to microchips. *Science*, 283:46–49.

Ghosal, S. (2002a). Band broadening in a microcapillary with a stepwise change in the zeta-potential. *Anal. Chem.*, 74 (16):4198–4203.

Ghosal, S. (2002b). Effect of analyte adsorption on the electroosmotic flow in microfluidic channels. *Anal. Chem.*, 74 (4):771–775.

Ghosal, S. (2002c). Lubrication theory for electro-osmotic flow in a microfluidic channel of slowly varying cross-section and wall charge. *J. Fluid Mech.*, 459:103–128.

Ghosal, S. (2003). The effect of wall interactions in capillary-zone electrophoresis. *J. Fluid Mech.*, 491:285–300.

Giridharan, M. G. and Krishnan, A. (1998). An implicit numerical model for electrophoretic systems. In *Proc. ASME International Mechanical Engineering Congress and Exposition, Micro-Electro-Mechanical Systems (MEMS)*, pages 61–68.

Glowinsky, R., Pan, T.-W., Hesla, T. I., and Joseph, D. D. (1999). A distributed Lagrange multiplier/fictitious domain method for particulate flows. *Int. J. Multiphase Flow*, 25:755–794.

Golding, R. K., Lewis, P. C., Kumacheva, E., Allard, M., and Sargent, E. H. (2004). In situ study of colloid crystallization in constrained geometry. *Langmuir*, 20:1414–1419.

Goldman, A. J., Cox, R. G., and Brenner, H. (1967). Slow viscous motion of a sphere parallel to a plane wall - i. motion through a quiescent fluid. *Chem. Eng. Sci.*, 22:637–651.

Golse, F. (1989). Applications of the Boltzmann equation within the context of upper-atmosphere vehicle aerodynamics. *Comp. Meth. Appl. Mech. Eng.*, 75:299.

Gonnet, P., Zimmerli, U., Walther, J. H., Werder, T., and Koumoutsakos, P. (2004). Wetting and hydrophobicity of nanoscale systems with impurities. *Proceedings of the ICCN,NSTI-Nanotech 2004, www.nsti.org*, 3:69–72.

Gonzalez, A., Ramos, A., Green, N., Castellanos, A., and Morgan, H. (2000). Fluid flow induced by nonuniform AC electric fields in electrolytes on microelectrodes: II. a linear double layer analysis. *Phys. Rev. E*, 61(4):4019–4028.

Gordillo, M. and Marti, J. (2003). Water on the outside of carbon nanotube bundles. *Phys. Rev. E*, 67:205425.

Grad, H. (1949). On the kinetic theory of rarefied gases. *Comm. Pure Appl. Math.*, 2:331–407.

Graham, M. D. and Kevrekidis, I. G. (1996). Alternate approaches to the Karhunen-Loève decomposition for model reduction and data analysis. *Computer Chem. Engng.*, 20:495–506.

Grateful, T. M. and Lightfoot, E. N. (1992). Finite difference modelling of continuous-flow electrophoresis. *J. Chromatogr.*, 594:341–349.

Green, M. and Lu, J. (1997). Simulation of water in small pore: Effect of electric field and density. *J. Phys. Chem. B*, 101:6512–6524.

Green, N. and Morgan, H. (1997). Rapid Communication: Dielectrophoretic separation of nano-particles. *J. Phys. D: Allp. Phys.*, 30:L41–L44.

Green, N. and Morgan, H. (1998). Separation of submicrometer particles using a combination of dielectrophoretic and electrohydrodynamic forces. *J. Phys. D: Appl. Phys.*, 3:25–30.

Green, N., Ramos, A., Gonzalez, A., Morgan, H., and Castellanos, A. (2000). Fluid flow induced by nonuniform AC electric fields in electrolytes on microelectrodes: I. Experimental measurements. *Phys. Rev. E*, 61(4):4011–4018.

Green, N., Ramos, A., Gonzalez, A., Morgan, H., and Castellanos, A. (2002). Fluid flow induced by nonuniform AC electric fields in electrolytes on microelectrodes: III. Observation of streamlines and numerical simulation. *Phys. Rev. E*, 66:Art. No. 026305.

Greengard, L. (1987). *The rapid evaluation of potential fields in particle systems*. MIT Press, Cambridge, MA.

Greengard, L. and Rokhlin, V. (1987). Lattice-sum methods for calculating electrostatic interactions in molecular simulations. *J. Comput. Phys.*, 73:325–348.

Greenwood, P. A. and Greenway, G. M. (2002). Sample manipulation in micro total analytical systems. *Trends in Analytical Chemistry*, 21:726–740.

Griffiths, S. K. and Nilson, R. H. (1999). Hydrodynamic dispersion of a neutral nonreacting solute in electroosmotic flow. *Anal. Chem.*, 71:5522–5529.

Griffiths, S. K. and Nilson, R. H. (2000). Electroosmotic fluid motion and late-time solute transport for large Zeta potentials. *Anal. Chem.*, 72:4776–4777.

Grisnik, T. A., Smith, S. P., and Saltz, L. E. (1987). Experimental study of low Reynolds number nozzles. In *Paper AIAA 87-0992, 19th AIAA/DGLR/JSASS International Electric Propulsion Conference*.

Groot, R. D. and Warren, P. B. (1997). Dissipative particle dynamics: Briding the gap between atomistic and mesoscopic simulation. *J. Chem. Phys.*, 107(11):4423–4435.

Gross, E. P. and Ziering, S. (1958). Kinetic theory of linear shear flow. *Phys. Fluids A*, 1:215–224.

Gubskaya, A. V. and Kusalik, P. G. (2002). The total molecular dipole moment for liquid water. *J. Chem. Phys.*, 117:5290–5302.

Gulczinski, F. S., Dulligan, M. J., Lake, J. P., and Spanjer, G. G. (2000). Micropropulsion research at AFRL. In *AIAA-2000-3255*.

Haberman, W. L. and Sayre, R. M. (1958). Motion of rigid and fluid spheres in stationary and moving liquids inside cylindrical tubes. David Taylor Model Basin Report 1143, U.S. Navy Dept., Washington D.C.

Hadjiconstantinou, N. G. (1999). Hybrid atomistic-continuum formulations and the moving contact-line problem. *J. Comp. Phys.*, 154:245–265.

Hadjiconstantinou, N. G. (2000). Analysis of discretization in the DSMC. *Phys. Fluids*, 12:2634.

Hadjiconstantinou, N. G. (2003a). Comment on Cercignani's second-order slip coefficient. *Phys. Fluids*, 15(8):2352–2354.

Hadjiconstantinou, N. G. (2003b). Dissipation in small scale gasous flows. *J. Heat Transfer*, 125:944–947.

Hadjiconstantinou, N. G., Garcia, A., Bazant, M., and He, G. (2003). Statistical error in particle simulations of hydrodynamic phenomena. *J. Comp. Phys.*, 187:274–297.

Hadjiconstantinou, N. G. and Patera, A. T. (1997). Heterogeneous atomistic-continuum representations for dense fluid systems. *I. J. Mod. Phys. C,* 8:967–976.

Haile, J. M. (1992). *Molecular Dynamics Simulation. Elementary Methods.* John Wiley & Sons, New York.

Halicioglu, T. and Jaffe, R. L. (2002). Solvent effect on functional groups attached to edges of carbon nanotubes. *Nano Lett.,* 2(6):573–575.

Halsey, T. C. and Toor, W. (1990). Structure of electroheological fluids. *Phys. Rev. Lett.,* 65:2820.

Hamaker, H. C. (1940). Formation of a deposit by electrophoresis. *Trans. Faraday Soc.,* 36:279–283.

Hamaker, H. C. and Verwey, E. J. (1940). The role of the forces between the particles in electrodeposition and other phenomena. *Trans. Faraday Soc.,* 36:180–185.

Hardy, R. L. (1971). Multiquadric equations for topography and other irregular surfaces. *J. Geophys. Res.,* 176:1905–1915.

Harley, C. J. (1993). *Compressible Gas Flows in Microchannels and Microjets.* PhD thesis, University of Pennsylvania.

Harley, J. C., Huang, Y., Bau, H. H., and Zemel, J. N. (1995). Gas flow in micro-channels. *J. Fluid Mech.,* 284:257–274.

Hartnig, C., Witschel, W., and Sphor, E. (1998). Molecular dynamics study of the structure and dynamics of water in cylindrical pores. *J. Phys. Chem. B,* 102:1241–1249.

Hash, D. and Hassan, H. (1996). Assessment of schemes for coupling Monte Carlo and Navier-Stokes solution methods. *J. Thermophys. Heat Transfer,* 10(2):242–249.

Hash, D. and Hassan, H. (1997). Two-dimensional coupling issues of hybrid DSMC/Navier-Stokes solvers. *Proceedings of AIAA Conference,* pages AIAA 97–2507.

Hayes, M. A. and Ewing, A. J. (2000). Electroosmotic flow control and monitoring with an applied radial voltage for capillary zone electrophoresis. *Anal. Chem.,* 64:56–62.

Hayes, M. A., Polson, N. A., and Garcia, A. A. (2001). Active control of dynamic supraparticle structures in microchannels. *Langmuir,* 17:2866–2871.

Hayward, R. C., Saville, D. A., and Aksay, I. A. (2000). Colloidal crystals with tunable micropatterns: Current density modulation with uv-light during electrophoretic deposition. *Nature,* 404:56–59.

Heinbuch, U. and Fischer, J. (1989). Liquid flow in pores: Slip, no-slip, or multilayer sticking. *Phys. Rev. A,* 40(2):1144–1146.

Henderson, D., Busath, D. D., and Rowley, R. (2001). Fluids near surfaces and in pores and membrane channels. *Prog. Surf. Sci.,* 65:279–295.

Henderson, R. D. and Karniadakis, G. E. (1991). Hybrid spectral element-low order methods for incompressible flows. *J. Sci. Comp.,* 6(2):79.

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Hermanson, K. D., Lumsdon, S. O., Williams, J. P., Kaler, E. W., and Velev, O. D. (2001). Dielectrophoretic assembly of electrically functional microwires from nanoparticle suspensions. *Science*, 294:1082–1086.

Herr, A., Molho, J., Santiago, J. G., Mungal, M. G., Kenny, T. W., and Garguilo, M. G. (2000). Electroosmotic capillary flow with non uniform zeta potential. *Anal. Chem.*, 72:1053–1057.

Heslot, F., Fraysse, N., and Cazabat, A. M. (1989). Molecular layering in the spreading of wetting liquid-drops. *Nature*, 338:640–642.

Hess, B. (2002). Determining the shear viscosity of model liquids from molecular dynamics simulations. *J. Chem. Phys.*, 116:209–217.

Heyes, D. M. (1981). Electrostatic potentials and fields in infinite point charge lattices. *J. Chem. Phys.*, 74:1924–1929.

Higuera, F. J. and Jiménez, J. (1989). Boltzmann approach to lattice gas simulations. *Europhys. Lett.*, 9:663–668.

Higuera, F. J. and Succi, S. (1989). Simulating the flow around a cylinder with a lattice Boltzmann equation. *Europhys. Lett.*, 8:517–521.

Hille, B. (2001). *Ion channels of excitable membranes.* Sinauer Associates, Inc.

Hirt, C. W., Amsden, A. A., and Cook, H. K. (1974). An arbitrary Lagrangian-Eulerian computing method for all flow speeds. *J. Comp. Phys.*, 14:27.

Ho, C. M. (January 21-25, 2001). Fluidics – The link between micro and nano science and technologies. In *MEMS-2001, Interlaken, Switzerland.*

Ho, C. M. and Tai, Y. C. (1998). Micro-electro-mechanical systems (MEMS) and fluid flows. *Ann. Rev. Fluid Mech.*, 30:579–612.

Ho, L.-W. (1989). *A Legendre Spectral Element Method for Simulation of Incompressible Unsteady Free-Surface Flows.* PhD thesis, Massachusetts Institute of Technology.

Hockney, R. W. and Eastwood, J. W. (1981). *Computer simulation using particles.* McGraw- Hill, New York.

Holdych, D. J., Noble, D. R., Georgiadis, J. G., and Buckius, R. O. (2004). Truncation error analysis of lattice Boltzmann methods. *J. Comp. Phys.*, 193:595–619.

Hoogerburgge, P. J. and Koelman, J. M. (1992). Simulating microscopic hydrodynamic phenomena with dissipative particle dynamics. *Europhy. Lett.*, 19(3):155–160.

Hoover, W. G. (1985). Canonical dynamics: equilibrium phase-space distributions. *Phys. Rev. A*, 31:1695–1697.

Horiuchi, K., Dutta, P., Chi, H., and Ivory, C. F. (2003). High resolution separation of proteins in a polymeric micro-fluidic chip. In *2003 ASME International Mechanical Engineering Congress*, pages IMECE2003–41206, Washington, D.C., November 15–12, 2003.

Horvath, J. and Dolnik, V. (2001). Polymer wall coatings for capillary electrophoresis. *Electrophoresis*, 22:644–655.

Hou, S., Zou, Q., Chen, S., Doolen, G. D., and Cogley, A. C. (1995). Simulation of incompressible Navier-Stokes fluid flows using a lattice Boltzann method. *J. Comp. Phys.*, 118:329.

Howe, R. T., Muller, R. S., Gabriel, K. J., and Trimmer, W. (1990). Silicon micromechanics: Sensors and actuators on a chip,. *IEEE Spectrum*, 27(7):29–35.

Hsia, Y. T. and Domoto, G. A. (1983). An experimental investigation of molecular rarefaction effects in gas lubricated bearings at ultra low clearances. *Journal of Lubrication Technology*, 105:120–130.

Huang, A. B. and Stoy, R. L. (1966). Rarefied gas channel flow for three molecular models. *Phys. Fluids*, 9 (12):2327–2336.

Huang, W. D., Bogy, D. B., and Garcia, A. L. (1997). Three-dimensional direct simulation Monte Carlo method for slider airbearings. *Phys. Fluids*, 9(6):1764–1769.

Hummer, G., Rasaiah, J. C., and Noworyta, J. P. (2001). Water conduction through the hydrophobic channel of a carbon nanotube. *Nature*, 414:188–190.

Hung, E. S. and Senturia, S. D. (1999). Generating efficient dynamical models for microelectromechanical systems from a few finite-element simulation runs. *J. Microelectromech. Sys.*, 8:280–289.

Hunter, R. J. (1981). *Zeta Potential in Colloid Science: Principles and Applications*. Academic Press Inc, New York.

Ichikawa, K., Kameda, Y., Yamaguchi, T., Wakita, H., and Misawa, M. (1991). Neutron-diffraction investigation of the intramolecular structure of a water molecule in the liquid-phase at high-temperatures. *Mol. Phys.*, 73:79–86.

Ichiki, K. and Brady, J. F. (2001). Many-body effects and matrix inversion in low-Reynolds number hydrodynamics. *Phys. Fluids*, 13:350–353.

Ichimura, K., Oh, S.-K., and Nakawa, M. (2000). Light-driven motion of liquids on a photoresponsive surface. *Science*, 288:1624–1626.

Iijima, S. (1991). Helical microtubules of graphitic carbon. *Nature*, 354:56–58.

Inman, R. M. (1964). Laminar slip flow heat transfer in a parallel plate channel or a round tube with uniform wall heating. Technical report, NASA, Report D-2393.

Isenberg, C. (1992). *The Science of Soap Films and Soap Bubbles*. Dover, New York.

Ismail, Y. I. (2002). Efficient model order reduction via multi-node moment matching. In *Proceedings of ICCAD*, pages 767–774.

Israelachvili, J. (1992a). *Intermolecular and Surface Forces*. Academic Press, New York.

Israelachvili, J. N. (1992b). Adhesion forces between surfaces in liquids and condensable vapours. *Surf. Sci. Rep.*, 14:109–158.

Ito, T., Sun, L., and Crooks, R. M. (2003). Simultaneous determination of the size and surface charge of individual nanoparticles using a carbon nanotube-based Coulter Counter. *Anal. Chem.*, 75(10):2399–2406.

Ivanov, M. S., Markelov, G. N., Ketsdever, A. D., and Wadsworth, D. C. (1999). Numerical study of cold gas micronozzle flows. In *Paper AIAA 99-0166, 37th Aerospace Sciences Meeting & Exhibit, January 11-14, Reno, NV*.

Jacobs, H. O., Tao, A. R., Schwartz, A., Gracias, D. H., and Whitesides, G. M. (2002). Fabrication of a cylindrical display by patterned assembly. *Science*, 296(323-325):20–31.

Jacobson, S. C., McKnight, T. E., and Ramsey, J. M. (1999). Microfluidic devices for electrokinetically driven parallel and serial mixing. *Anal. Chem.*, 71:4455–4459.

Janos, P. (1999). Role of chemical equilibria in the capillary electrophoresis of inorganic substances. *J. Chromatogr. A*, 834:3–20.

Janson, S. W. and Helvajian, H. (1997). Batch-fabricated microthrusters: Initial results. In *Paper AIAA 96-2988, 32nd AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit,*.

Jeffrey, D. J. (1982). Low Reynolds number flow between converging spheres. *Mathematika*, 29:58–66.

Jin, W., Koplik, J., and Banavar, J. R. (1997). Wetting hysteresis at the molecular scale. *Phys. Rev. Lett.*, 78:1520–1523.

Jin, X., Li, G., and Aluru, N. R. (2001). On the equivalence between least-squares and kernel approximation in meshless methods. *CMES: Computer Modeling in Engineering and Sciences*, 2(4):447–462.

Jin, X., Li, G., and Aluru, N. R. (2004). Positivity conditions in meshless collocation methods. *Comput. Methods Appl. Mech. Eng.*, 193(12-14):1171–1202.

Johnson, A. A. and Tezduyar, T. E. (1996). Simulation of multiple spheres falling in a liquid-filled tube. *Comput. Meth. Appl. Mech. Eng.*, 134:351–373.

Jones, S. W. (1991). The enhancement of mixing by chaotic advection. *Phys. Fluids A*, 3(5):1081–1086.

Jones, S. W., Thomas, O. M., and Aref, H. (1989). Chaotic advection by laminar flow in a twisted pipe. *J. Fluid Mech.*, 209:335–357.

Jones, T. B. (2001). Liquid dielectrophoresis on the microscale. *J. of Electrostatics*, 51-52:290–299.

Jones, T. B., Fowler, J. D., Chang, Y. S., and Kim, C.-J. (2003). Frequency-based relationship of electrowetting and dielectrophoretic liquid microactuation. *Langmuir*, 19:7646–7651.

Jones, T. B., Gunji, M., and Feldman, H. J. (2001). Dielectrophoretic liquid actuation and nanodroplet formation. *J. Apply. Phys.*, 89:1441–1448.

Kaiktsis, L., Karniadakis, G. E., and Orszag, S. A. (1996). Unsteadiness and convective instabilities in flow over a backward-facing step. *J. Fluid Mech.*, 321:157.

Kalko, S. G., Hernandez, J. A., Grigera, J. R., and Fischbarg, J. (1995). Osmotic permeability in molecular dynamics simulation of water transport through a single-occupancy pore. *Biochimica et Biophysica Acta*, 1240:159–166.

Kalyuzhnyi, Y. V. and Cummings, P. T. (1996). Phase diagram for the Lennard-Jones fluid modelled by the hard-core Yukawa fluid. *Mol. Phys.*, 87:1459–1462.

Kang, M. S. and Martin, C. R. (2001). Investigations of potential-dependent fluxes of ionic permeates in gold nanotubule membranes prepared via the template method. *Langmuir*, 17(9):2753–2759.

Kaniansky, D., Masar, M., and Bielcikova, J. (1997). Electroosmotic flow separation for capillary zone electrophoresis in a hydrodynamically closed separation system. *J. Chromatogr. A*, 792:483–494.

Kansa, E. J. (1990a). Multiquadrics – a scattered data approximation scheme with applications to computational fluid dynamics – I, surface approximations and partial derivative estimates. *Comp. Math. Appl.*, 19:127–145.

Kansa, E. J. (1990b). Multiquadrics – a scattered data approximation scheme with applications to computational fluid dynamics – II, solutions to parabolic, hyperbolic and elliptic partial differential equations. *Comp. Math. Appl.*, 19:147–161.

Karlin, I. V., Ferrante, A., and Ottinger, H. C. (1999). Perfect entropy functions of the lattice Boltzmann method. *Europhys. Lett.*, 47:182–188.

Karniadakis, G. E., Israeli, M., and Orszag, S. A. (1991). High-order splitting methods for incompressible Navier-Stokes equations. *J. Comp. Phys.*, 97:414.

Karniadakis, G. E., Orszag, S. A., Ronquist, E. M., and Patera, A. T. (1993). Spectral element and lattice gas methods for incompressible fluid dynamics. In *Incompressible Computational Fluid Dynamics, eds. M.D. Gunzburger and R.A. Nicolaides, Cambridge University Press, New York*.

Karniadakis, G. E. and Sherwin, S. J. (1999). *Spectral/hp Element Methods for CFD*. Oxford University Press.

Kasianowicz, J. J., Brandin, E., Branton, D., and Beamer, D. W. (1996). Characterization of individual polynucleotide molecules using a membrane channel. *Proc. Natl. Acad. Sci. (USA)*, 93.

Kataoka, D. E. and Troian, S. M. (1999). Patterning liquid flow on the microscopic scale. *Nature*, 402:794–797.

Keh, H. and Liu, Y. C. (1995). Electrokinetic flow in a circular capillary with a surface charge layer. *J. Colloids and Interface Surfaces*, 172:222–229.

Keh, H. and Tseng, H. C. (2001). Transient electrokinetic flow in fine capillaries. *J. Colloid Interface Sci.*, 242:450–459.

Keh, H. J. and Anderson, J. L. (1985). Boundary effects on electrophoretic motion of colloidal spheres. *J. Fluid Mech.*, 153:417–439.

Kemery, P. J., Steehler, J. K., and Bohn, P. W. (1998). Electric field mediated transport in nanometer diameter channels. *Langmuir*, 14:2884–2889.

Kennard, E. H. (1938). *Kinetic Theory of Gasses*. McGraw-Hill Book Co. Inc., New York.

Ketsdever, A. D., Green, A. A., Muntz, E. P., Wadsworth, D., and Vargo, S. E. (2000a). Heat transfer measurements and calculations for a MEMS fabricated resistojet: Initial Results. In *34th AIAA Thermophysics Conference, June 19-22, 1995, Denver, CO, AIAA 2000-2505*.

Ketsdever, A. D., Wadsworth, D., and Muntz, E. P. (2000b). Influence of gas-surface interaction models on predicted performance of a micro-resistojet. In *34th AIAA Thermophysics Conference, June 19-22, 1995, Denver, CO, AIAA 2000-2430*.

Ketsdever, A. D., Wadsworth, D. C., Vargo, S., and Muntz, E. P. (1998). The free molecule micro-resistojet: An interesting alternative to nozzle expansion. In *Paper AIAA 98-3918, 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, July 13-15, Cleveland, OH*.

Kihm, K. D., Banarjee, A., Choi, C. K., and Takagi, T. (2004). Near-wall hindered Brownian diffusion of nanoparticles examined by three dimensional ratiometric total internal reflection fluorescence microscopy (3D R-TIRFM). *In Press, Experiments in Fluids*.

Kim, E., Xia, Y., and Whitesides, G. M. (1997). Two- and three-dimensional crystallization of polymeric microspheres by micromolding capillaries. *Advanced Materials*, 8:245–247.

Kim, H.-J. (2004). Quantification of chaotic mixing in microfluidic systems. Master's thesis, Texas A&M University, College Station, TX.

Kim, M. J., Kihm, K. D., and Beskok, A. (2002). A comparative study of μ-PIV measurements and numerical simulations of electroosmotic flows in various micro-channel configurations. *Exp. Fluids*, 33:170–180.

Kim, S. and Karrila, S. J. (1991). *Microhydrodynamics: Principles and Selected Applications*. Butterworth-Heinemann.

Kittilsland, G., Steme, G., and Nordoen, B. A. (1990). Submicron particle filter in silicon. *Sens. Actuators, A: Physical*, 23:904–907.

Kleparnik, K., Mala, Z., and Bocek, P. (2001). Fast separation of DNA sequencing fragments in highly alkaline solutions of linear polyacrylamide using electrophoresis in bare silica capillaries. *Electrophoresis*, 22:783–788.

Knudsen, M. (1909). Die gesetze der molekularströmung und der inneren riebungsströmung der gase durch röhnen. *Annalen der Physik*, 28:75–130.

Knudsen, M. (1910a). Eine revision der gleichgewichtsbedingung der gase. Thermische moleckularstromung. *Ann. Phys.*, 31:205–229.

Knudsen, M. (1910b). Thermischer moleckulardruck der gase in rohren. *Ann. Phys.*, 33:1435–1448.

Kogan, M. (1969). *Rarefied Gas Dynamics*. Plenum Press, New York.

Kogan, M. N., Galkin, V. S., and Fridlender, O. G. (1976). Stresses produced in gases by temperature and concentration inhomogeneities. New type of free convection. *Sov. Phys. Usp.*, 19:420–438.

Kohlhof, S., Gumbsch, P., and Fischmeister, H. F. (1991). Crack propagation in B.C.C. crystals studied with a combined finite-element and atomistic model. *Philosophical Magazine A*, 64:851.

Koplik, J. and Banavar, J. R. (1995). Continuum deductions from molecular hydrodynamics. *Ann. Rev. Fluid Mech.*, 27:257–292.

Koplik, J. and Banavar, J. R. (2000). Molecular simulations of dewetting. *Phys. Rev. Lett.*, 84:4401–4404.

Koplik, J., Banavar, J. R., and Willemsen, J. F. (1987). Molecular dynamics of Poiseuille flow and moving contact lines. *Phys. Rev. Lett.*, 60(13):1282–1285.

Koplik, J., Banavar, J. R., and Willemsen, J. F. (1989). Molecular dynamics of fluid flow at solid surfaces. *Phys. Fluids A*, 1:781–794.

Kopriva, D. A. (1991). Multidomain spectral solutions of the Euler gas-dynamics equations. *J. Comp. Phys.*, 96:428.

Krishnamoorthy, S. and Giridharan, M. G. (2000). Analysis of sample injection and band-broadening in capillary electrophoresis microchips. In *2000 Int'l. Conference on Modeling and Simulation of Microsystems (MSM)*.

Kruger, A. J., Larmit, A. J. F., and Wit, M. H. D. (1970). Flow of a rarefied gas through a long capillary (cylindrical or bounded by planes) generated by a temperature gradient. In *Proceedings of the Seventh International Symposium on Rarefied Gas Dynamics*, pages 1015–1022.

Kubo, R., Tudo, M., and Hashitsume, N. (1991). *Statistical Physics II.* Berlin:Springer.

Kumar, S. and Beskok, A. (2002). Heat and mass transfer in a peristaltic micro mixer. *ASME J. Heat Transfer*, 125(4):548.

Kuo, T. C., Cannon, D. M., Chen, Y., Tulock, J. J., Shannon, M. A., Sweedler, J. V., and Bohn, P. W. (2003a). Gateable nanofluidic interconnects for multilayered microfluidic separation systems. *Anal. Chem.*, 75:1861–1876.

Kuo, T. C., Cannon, D. M., Shannon, M. A., Bohn, P. W., and Sweedler, J. V. (2003b). Hybrid three-dimensional nanofluidic/microfluidic devices using molecular gates. *Sens. Actuators, A*, 102:223–233.

Kuo, T. C., Sloan, L. A., Sweedler, J. V., and Bohn, P. W. (2001). Manipulating molecular transport through nanoporous membranes by control of electrokinetic flow: Effect of surface charge density and Debye length. *Langmuir*, 17:6298–6303.

Kusalik, P. G., Liden, F., and Svishchev, I. M. (1995). Calculation of the third virial coefficient for water. *J. Chem. Phys.*, 103:10169–10175.

Kutter, J. P. (2000). Current developments in electrophoretic and chromatographic separation methods on microfabricated devices. *Trends in Analytical Chemistry*, 19:352–363.

Kwon, S. and Lee, L. P. (2001). Focal length control by microfabricated planar electrodes-based liquid lens(uPELL). *Proc. 11th International Conference on Solid-State Sensors and Actuators, Eurosensors XV, Transducers 2001*, pages 1348–1351.

Ladd, A. J. (1994a). Numerical simulations of particulate suspensions via a discretized lattice Boltzmann equation. Part 1. Theoretical foundation. *J. Fluid Mech.*, 271:285–309.

Ladd, A. J. (1994b). Numerical simulations of particulate suspensions via a discretized lattice Boltzmann equation. Part 2. Numerical results. *J. Fluid Mech.*, 271:311–339.

Lallemand, P. and Luo, L.-S. (2003). Theory of the lattice Boltzmann method: Acoustic and thermal properties in two and three dimensions. *Phys. Rev. E*, 68:036706.

Lancaster, P. and Salkauskas, K. (1981). Surface generated by moving least squares methods. *Mathematics of Computation*, 37:141–158.

Larrodé, F. E., Housiadas, C., and Drossinos, Y. (2000). Slip-flow heat transfer in circular tubes. *Int. J. Heat Mass Transfer*, 43:2669–2680.

Lauga, E. and Stones, H. A. (2003). Effective slip in pressure-driven Stokes flow. *J. Fluid Mech.*, 489:55–77.

Lee, J. and Kim, C.-J. (2000). Surface tension-driven microactuation based on continuous electrowetting. *J. Microelectromech. Sys.*, 9(2):171–180.

Lee, J., Moon, H., Fowler, J., Schoellhammer, T., and Kim, C.-J. (2002). Electrowetting and electrowetting-on-dielectric for microscale liquid handling. *Sens. Actuators, A*, 95:259–268.

Lee, W. Y., Lee, Y. K., Wong, M., and Zohar, Y. (2000). Microchannels in series with gradual contraction/expansion. In *ASME, MEMS-Vol. 2, Micro-Electro-Mechanical Systems*, pages 467–472.

Lee, Y. K. (2002). Lyapunov exponents in a micro chaotic mixer. *Int. J. Nonlinear Sci. Num. Sim.*, 3:561–564.

Lees, A. W. and Edwards, S. F. (1972). The computer study of transport processes under extreme conditions. *J. Phys. C*, 5:1921.

Leo, J. and Maranon, J. (2003). Confined water in nanotube. *J. Mol. Struct. (Theochem)*, 623:159–166.

LeTallec, P. and Mallinger, F. (1997). Coupling Boltzmann and Navier-Stokes equations by half fluxes. *J. Comp. Phys.*, 136(1):51–67.

Levesque, D. and Verlet, L. (1970). Computer experiments on classical fluids. III. time-dependent self-correlation functions. *Phys. Rev. A*, 2(4):2514–2522.

Levich, V. G. (1962). *Physicochemical Hydrodynamics*. Prentice-Hall, Inc.

Levinger, N. E. (2002). Water in confinement. *Science*, 29:1722–1723.

Li, B. and Kwok, D. Y. (2003). Discrete Boltzmann equation for microfluidics. *Phys. Rev. Lett.*, 90(12):124502.

Li, G. (2003). *Efficient Mixed-Domain Analysis of Electrostatic Microelectromechanical Systems (MEMS)*. PhD thesis, University of Illinois at Urbana-Champaign.

Li, G. and Aluru, N. R. (2003). A boundary cloud method with a cloud-by-cloud polynomial basis. *Eng. Anal. Boundary Elem.*, 27(1):57–71.

Li, J., Stein, D., McMullan, C., Branton, D., Aziz, M., and Golovchenko, J. (2001a). Ion-beam sculpting at nanometre length scales. *Nature*, 412(6843):166–169.

Li, J., Stein, D., McMullan, C., Branton, D., Aziz, M. J., and Golovchenko, J. A. (2001b). Ion-beam sculpting at nanometer length scales. *Nature*, 412.

Li, S. and Liu, W. K. (2002). Meshfree and particle methods and their applications. *Applied Mechanics Review*, 55:1–34.

Li, W. L., Lin, J. W., Lee, S. C., and Chen, M. D. (2002). Effects of roughness on rarefied gas flow in long microtubes. *J. Micromech. Microeng.*, 12:149–156.

Libera, J. and Gogotsi, Y. (2001). Hydrothermal synthesis of graphite tubes using Ni catalyst. *Carbon*, 39:1307.

Liepmann, H. W. and Roshko, A. (1957). *Elements of Gas Dynamics*. John Wiley and Sons, Inc.

Lin, H., Storey, B. D., Oddy, M. H., Chen, C. H., and Santiago, J. G. (2004). Instability of electrokinetic microchannel flows with conductivity gradients. *Phys. Fluids*, 16(6):1922–1935.

Lindahl, E., Hess, B., and van der Spoel, D. (2001). GROMACS 3.0: a package for molecular simulation and trajectory analysis. *J. Mol. Mod.*, 7(8):306–317.

Link, D., Anna, S. L., Weitz, D., and Stone, H. A. (2004). Geometrically mediated breakup of drops in microfluidic devices. *Phys. Rev. Lett.*, 92(5):054503–1–054503–4.

Lippmann, M. G. (1875). Relations entre les phenomenes electriques et capillaires. *Ann. Chim. Phys.*, 5(11):494–549.

Lishchuk, S. V. and Fischer, J. (2001). Velocity distribution of water molecules in pore under microwave electric field. *Int. J. Therm. Sci.*, 40:717–723.

Liszka, T. J., Duarte, C. A., and Tworzydlo, W. W. (1996). hp-meshless cloud method. *Comput. Methods Appl. Mech. Eng.*, 139:263–288.

Liu, D. (2004). *Spectral Element/Force Coupling Method: Application to Colloidal Microdevices and Self-Assembled Structures in 3D Domains*. PhD thesis, Brown University.

Liu, D., Maxey, M. R., and Karniadakis, G. E. (2002). A fast method for particulate microflows. *J. Microelectromech. Sys.*, 11(6):691–702.

Liu, H. F., Gatsonis, N., Beskok, A., and Karniadakis, G. E. (1998). Simulation models for rarefied sphere in a pipe. In *Proceedings of the Twenty first International Symposium on Rarefied Gas Dynamics*.

Liu, J., Lawrence, E. M., Wu, A., Ivey, M. L., Flores, G., Javier, K., Bibette, J., and Richard, J. (1995). Field-induced structures in ferrofluid emulsions. *Phys. Rev. Lett.*, 74:2828–2831.

Liu, J. Q., Tai, Y. C., Pong, K. C., and Ho, C. M. (1993). Micromachined channel/pressure sensor systems for micro flow studies. *In The 7th Int. Conf. on Solid-State Sensors and Actuators*, pages 995–998.

Liu, M., Muzzio, F. J., and Peskin, R. L. (1994). Quantification of mixing in aperiodic chaotic flows. *Chaos, Solitons and Fractals*, 4(6):869–893.

Liu, N. and Ng, E. Y. (2001). The posture effects of a slider air bearing on its performance with a direct simulation Monte Carlo method. *J. of Micromech. Microeng.*, 11:463–473.

Liu, Y., Fanguy, J. C., Bledsoe, J. M., and Henry, C. S. (2000). Dynamic coating using polyelectrolyte multilayers for chemical control of electroosmotic flow in capillary electrophoresis microchips. *Anal. Chem.*, 72(24):5939–5944.

Liu, Y. and Ichiye, T. (1996). Soft sticky dipole potential for liquid water: A new model. *J. Phys. Chem.*, 100:2723–2730.

Lo, W. Y. and Chan, K. (1994). Poisson-Boltzmann calculations of ions in charged capillaris. *J. Chem. Phys.*, 143:339–353.

Lockerby, D. A. and Reese, J. M. (2003). High resolution Burnett simulations of micro Couette flow and heat transfer. *J. Comp. Phys.*, 188:333–347.

Loeb, L. B. (1961). *Kinetic Theory of Gases.* Dover Publications Inc., New York.

Lohner, R. and Yang, C. (1996). Improved ALE mesh velocities for moving bodies. *Comm. Num. Meth. Eng. Phys.*, 12:599–608.

Lomholt, S. (2000). *Numerical Investigations of Macroscopic Particle Dynamics in Microflows.* PhD thesis, Riso National Laboratory, Roskilde, Denmark.

London, A. P. (1996). A systems study of propulsion technologies for orbit and attitude control of microspacecraft. In *Master's thesis, Massachusetts Institute of Technology.*

Lord, R. G. (1976). Tangential momentum coefficients of rare gases on polycrystalline surfaces. In *Proceedings of the Tenth International Symposium on Rarefied Gas Dynamics*, pages 531–538.

Lord, R. G. (1991). Some extensions of the Cercignani-Lampis gas-surface scattering kernel. *Phys. Fluids A*, 3(4):706–710.

Lord, R. G. (1995). Some further extensions of the Cercignani-Lampis gas-surface scattering kernel. *Phys. Fluids A*, 7(5):1159–1161.

Lou, T., Dahlby, D. C., and Baganoff, D. (1998). A numerical study comparing kinetic flux vector splitting for the Navier-Stokes equations with a particle method. *J. Comp. Phys.*, 145:489–510.

Lovalenti, P. M. and Brady, J. F. (1993). The hydrodynamic force on a rigid particle undergoing arbitrary time-dependent motion at small Reynolds number. *J. Fluid Mech.*, 256:561–605.

Loyalka, S. and Hamoodi, S. (1990). Poiseuille flow of a rarefied gas in a cylindrical tube: Solution of linearized Boltzmann equation. *Phys. Fluids A*, 2 (11):2061–2065.

Loyalka, S. K. (1974). Comments on "Poiseuille flow and thermal creep of a rarefied gas between parallel plates". *Phys. Fluids*, 17:1053.

Loyalka, S. K. (1975). Kinetic theory of thermal transpiration and mechanocaloric effect. II. *J. Chem. Phys.*, 63:4054.

Loyalka, S. K. and Hickey, K. A. (1991). Kinetic theory of thermal transpiration and the mechanocaloric effect – planar flow of a rigid sphere gas with arbitrary accommodation at the surface. *J. Vac. Sci. Technol. A*, 9 (1):158.

Lue, L., Zoeller, N., and Blankschtein, D. (1999). Incorporation of nonelectrostatic interactions in the Poisson-Boltzmann equation. *Langmuir*, 15:3726–3730.

Lum, K., Chandler, D., and Weeks, J. D. (1999). Hydrophobicity at small and large length scales. *J. Phys. Chem. B*, 103:4570–4577.

Lum, K. and Luzar, A. (1997). Pathway to surface-induced phase transition of a confined fluid. *Phys. Rev. E*, 56:R6283–R6286.

Luo, L.-S. (2004). Comment on "Discrete Boltzmann equation for microfluidics". *Phys. Rev. Lett.*, 92(13):139401.

Luty, B. A., Tironi, I. G., and van Gunsteren, W. F. (1995). Lattice-sum methods for calculating electrostatic interactions in molecular simulations. *J. Chem. Phys.*, 103:3014–3021.

Lyklema, J., Rovillard, S., and Coninck, J. (1998). Electrokinetics: The properties of the stagnant layer unraveled. *Langmuir*, 14(20):5659–5663.

Lynden-Bell, R. M. and Rasaiah, J. C. (1996). Mobility and solvation of ions in channels. *J. Chem. Phys.*, 105:9266–9280.

Macounova, K., Cabrera, C. R., Holl, M. R., and Yager, P. (2000). Generation of natural pH gradients in microfluidic channels for use in isoelectric focusing. *Anal. Chem.*, 72(16):3745–3751.

Macounova, K., Cabrera, C. R., and Yager, P. (2001). Concentration and separation of proteins in microfluidic channels on the basis of transverse IEF. *Anal. Chem.*, 73(7):1627–1633.

Madou, M. (1997). *Fundamentals of Microfabrication*. CRC Press.

Magda, J. J., Tirrell, M., and Davis, H. T. (1985). Molecular dynamics of narrow, liquid-filled pores. *J. Chem. Phys.*, 83(4):1888–1901.

Mahoney, M. W. and Jorgensen, W. L. (2000). A five-site model for liquid water and the reproduction of the density anomaly by rigid, nonpolarizable potential functions. *J. Chem. Phys.*, 112:8910–8922.

Maitland, G. C., Rigby, M., Smith, E., and Wakeham, W. (1981). *Intermolecular Forces: Their Origin and Determination*. Clarendon Press, Oxford.

Mann, D. J. and Halls, M. D. (2003). Water alignment and proton conduction inside carbon nanotubes. *Phys. Rev. Lett.*, 90:195503.

Mantooth, H. A. and Vlach, M. (1992). Beyond SPICE with SABER and MAST. *Proceedings of IEEE International Symposium on Circuits and Systems*, 1:77–80.

Manz, A., Graber, N., and Widmer, H. M. (1990). Miniaturized total chemical analysis systems: A novel concept for chemical sensing. *Sens. Actuators, B*, 1:244–248.

Mao, Z. and Sinnott, S. B. (2000). A computational study of molecular diffusion and dynamic flow through carbon nanotubes. *J. Phys. Chem. B*, 104(19):4618–4624.

Margolin, L., Titi, E. S., and Wynne, S. (2003). The postprocessing Galerkin and nonlinear Galerkin methods – a truncation analysis point of view. *SIAM, J. Numer. Anal.*, 41:695–714.

Markelov, G. N. and Ivanov, M. S. (2001). Numerical study of 2D/3D micronozzle flows. In *Rarefied Gas Dynamics, eds. T.J. Bartel & M. Galiss*, volume AIP, Melville.

Markx, G., Dyda, P., and Pethig, R. (1996). Dielectrophoretic separation of bacteria using a conductivity gradient. *J. Biotechnol.*, 51:175–180.

Markx, G. and Pethig, R. (1995). Dielectrophoretic separation of cells: Continuous separation. *Biotechnol. Bioeng.*, 45:337–343.

Marques, W., Kremer, G. M., and Sharipov, F. M. (2000). Couette flow with slip and jump boundary conditions. *Continuum Mech. Thermodyn.*, 12:379–386.

Marry, V., Dufreche, J.-F., Jardat, M., and Turq, P. (2003). Equilibrium and electrokinetic phenomena in charged porous media from microscopic and mesoscopic models: electro-osmosis in montmorillonite. *Mol. Phys.*, 101(20):3111–3119.

Marti, J., Guardia, E., and Gordillo, M. C. (2002). Reorientational motions in sub- and supercritical water under extreme confinement. *Chem. Phys. Lett.*, 365:536–541.

Martin, C. R., Nishizawa, M., Jirage, K., and Kang, M. (2001). Investigations of the transport properties of gold nanotubule membranes. *J. Phys. Chem. B*, 105(10):1925–1934.

Martin, J. E., Odinek, J., and Halsey, T. C. (1992). Evolution of structure in quiescent electrorheological fluids. *Phys. Rev. Lett.*, 69:1524.

Mashl, R. J., Joseph, S., Aluru, N. R., and Jakobsson, E. (2003). Anomalously immobilized water: a new water phase induced by confinement in nanotubes. *Nano Lett.*, 3:589–592.

Matsumoto, H. and Colgate, J. E. (1990). Preliminary investigation of micropumping based on electrical control of interfacial tension. *Proc. IEEE on MEMS*, Napa Valley, CA:105–110.

Maurer, J., Tabeling, P., Joseph, P., and Willaime, H. (2003). Second-order slip laws in microchannels for helium and nitrogen. *Phys. Fluids*, 15(9):2613–2621.

Maxey, M. R. (1993). The equation of motion for a small rigid sphere in a nonuniform or unsteady flow. In *Proccedings of Gas-Solid Flows, The Fluids Engineering Conference, Washington, D.C., June 20-24*.

Maxey, M. R. and Dent, G. L. (1998). Some features of particle sedimentation at finite Reynolds numbers. In *Third International Conference on Multiphase Flow, ICMF98, June 8-12, Lyon, France*.

Maxey, M. R. and Patel, B. K. (2001). Localized force representations for particles sedimenting in Stokes flow. *Int. J. Multiphase Flow*, 27(9):1603–1626.

Maxey, M. R., Patel, B. K., Chang, E. J., and Wang, L.-P. (1997). Simulations of dispersed turbulent multiphase flows. *Fluid Dynamics Research*, 20:143–156.

Maxey, M. R. and Riley, J. J. (1983). Equation of motion for a small rigid sphere in a non-uniform flow. *Phys. Fluids*, 26:883–889.

Mayaram, K., Chern, J., and Yang, P. (1993). Algorithms for transient three-dimensional mixed-level circuit and device simulation. *IEEE Transactions on Computer-Aided Design of Integrated Circuits*, 12:1726–1733.

Mayaram, K. and Pederson, D. O. (1987). CODECS: an object-oriented mixed-level circuit and device simulator. In IEEE, editor, *1987 IEEE International Symposium on Circuits and Systems, Dunfey City Line Hotel, Philadelphia, PA, May 4–7, 1987*, pages 604–607. IEEE Computer Society Press.

McClain, M. A., Culbertson, C. T., Jacobson, S. C., and Ramsey, J. M. (2001). Flow cytometry of Escherichia coli on microfluidic devices. *Anal. Chem.*, 73(21):5334–5338.

McNamara, G. R. and Zanetti, G. (1988). Use of the Boltzmann equation to simulate lattice-gas automata. *Phys. Rev. Lett.*, 61:2332–2335.

McQuarrie, A. (1973). *Statistical Mechanics.* Harper and Row, New York.

Megaridis, C. M., Guvenc, A., Libera, J. A., and Gogotsi, Y. (2002). Attoliter fluid experiments in individual closed-end carbon nanotubes: Liquid film and fluid interface dynamics. *Phys. Fluids*, 14(2):L5–L8.

Mehner, J. E., Doetzel, W., Schauwecker, B., and Ostergaard, D. (2003). Reduced-order modeling of fluid structural interactions in MEMS based on modal projection techniques. In *Transducers*, pages 1840–1843.

Mehregany, M., Nagarkar, P., Senturia, S., and Lang, J. H. (Napa Valley, CA., February 1990). Operation of microfabricated harmonic and ordinary side-drive motor. *IEEE Micro Electro Mechanical System Workshop.*

Mei, R. and Adrian, R. J. (1992). Flow past a sphere with an oscillation in the free-stream velocity and unsteady drag at finite Reynolds numbers. *J. Fluid Mech.*, 237:323–341.

Meinhart, C. D., Wereley, S. T., and Santiago, J. G. (1999). PIV measurements of a microchannel flow. *Exp. in Fluids*, 27:414–419.

Meinhart, C. D., Wereley, S. T., and Santiago, J. G. (2000). A PIV algorithm for estimating time-averaged velocity fields. *J. Fluids Eng.*, 122:285–289.

Melvin, M. (1987). *Electrophoresis.* John Wiley and Sons Inc, London.

Mentor Graphics (1995). *HDL-A Reference Manual.*

Meyerovich, A. E. and Stepaniants, S. (1994). Transport phenomena at rough boundaries. *Phys. Rev. Lett.*, 73:316.

Meyerovich, A. E. and Stepaniants, S. (1997). Ballistic transport in ultrathin channels and films with rough surfaces. *J. Phys. Cond. Matt.*, 9:4157–4173.

Michaelides, E. E. (1997). Review – The transient equation of motion for particles, bubbles, and droplets. *J. Fluids Eng.*, 119:233–247.

Miller, S. A. and Martin, C. R. (2002). Controlling the rate and direction of electroosmotic flow in template-prepared carbon nanotube membranes. *J. Electroanal. Chem.*, 522(1):66–69.

Mitchell, M. J., Qiao, R., and Aluru, N. R. (2000). Meshless analysis of steady-state electro-osmotic transport. *J. Microelectromech. Sys.*, 9 (4):435–449.

Miyazima, S., Meakin, P., and Family, F. (1987). Aggregation of oriented anisotropic particles. *Phys. Rev. A*, 36:1421–1427.

Mo, G. and Rosenberger, F. (1990). Molecular dynamics simulation of flow in a two dimensional channel with atomically rough walls. *Phys. Rev. A*, 42:4688–4692.

Molho, J., Herr, A., Mosier, B. P., Santiago, J. G., Kenny, T. W., Brennen, R. A., Gordon, G. B., and Mohammadi, B. (2001). Optimization of turn geometries for microchip electrophoresis. *Anal. Chem.*, 73:1350–1360.

Molho, J., Herr, A. E., Desphande, M., Gilbert, J. R., Garguilo, M. G., Paul, P. H., John, P. M., Woudenberg, T. M., and Connel, C. (1998). Fluid transport mechanisms in micro fluidic devices. In *ASME International Mechanical Engineering Congress and Exposition*, pages 69–75.

Monaghan, J. J. (1992). Smoothed particle hydrodynamics. *Annu. Rev. Astron. Astrophys*, 30:543–574.

Monson, A. P., Rigby, M., and Steele, W. A. (1983). Non-additive energy effects in molecular liquids. *Mol. Phys.*, 49:893–898.

Moon, H., Cho, S., Garrell, R. L., and Kim, C.-J. (2002). Low voltage electrowetting-on-dielectric. *J. Appl. Phys.*, 92:4080–4087.

Morgan, H. and Green, N. G. (2003). *AC Electrokinetics: Colloids and Nanoparticles.* Research Studies Press Ltd, Hertfordshire, UK.

Morgan, H., Hughes, M. P., and Green, N. G. (1999). Separation of submicron bioparticles by dielectrophoresis. *Biophysical Journal*, 77:516–525.

Moroney, R. M., White, R. M., and White, R. T. (1991). Ultrasonicaly induced microtransport. In *Proccedings of the IEEE Workshop on MEMS, Amsterdam, pp. 277-282.*

Mosher, R. A. and Thormann, W. (2002). High-resolution computer simulation of the dynamics of isoelectric focusing using carrier ampholytes: The post-separation stabilizing phase revisited. *Electrophoresis*, 23:1803–1814.

Mott, D. R., Oran, E. S., and Kaplan, C. R. (2001). Microfilter simulations and scaling laws. *AIAA J. Thermophys. Heat Transfer*, 15(4):473–477.

Mueller, J. (1997). Thruster options for microspacecraft: A review and evaluation of existing hardware and emerging technoloies. In *Paper AIAA 97-3058, 33rd AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit,*.

Mukherjee, S. (2000). Finite parts of singular and hypersingular integrals with irregular boundary source points. *Eng. Anal. Boundary Elem.*, 24:767–776.

Mukherjee, T. and Fedder, G. K. (1998). Design methodology for a mixed-domain systems-on-a-chip. In *IEEE Computer Society Workshop on VLSI*, pages 96–101.

Muller, E. A. and Bubbins, K. E. (1998). Molecular simulation study of hydrophilic and hydrophobic behavior of activated carbon surfaces. *Carbon*, 36:1433–1438.

Muntz, E. P. (1989). Rarefied gas dynamics. *Ann. Rev. Fluid Mech.*, 21:387–417.

Myong, R. S. (1998). Thermodynamically consistent hydrodynamic computational models for high Knudsen number gas flows. *Phys. Fluids*, 11 (9):2468–2474.

Myong, R. S. (2004). Gaseous slip models based on the Langmuir adsorption isotherm. *Phys. Fluids*, 16(1):104–117.

Nada, H. and van der Eerden, J. P. (2003). An intermolecular potential model for the simulation of ice and water near the melting point: A six-site model of water. *J. Chem. Phys.*, 118:7401–7413.

Nagel, L. W. and Pederson, D. O. (1973). Simulation Program with Integrated Circuit Emphasis. In *Proceedings of the 16th Midwest Symposium Circuit Theory*, Waterloo, Canada.

Nakane, J. J., Akeson, M., and Marziali, A. (2003). Nanopores sensors for nucleic acid analysis. *J. Phys.: Condens. Matter*, 15:R1365–R1393.

Nanbu, K. (1983). Analysis of Couette flow by means of the new direct simulation method. *J. Phys. Soc. Japan*, 5:52.

Nguyen, N. T. and Wereley, S. (2003). *Fundamentals and Applications of Microfluidics*. Artech House, Microelectromechanical Systems Library.

Nie, X., Doolen, G. D., and Chen, S. (1998). Lattice-Boltzmann simulations of fluid flows in MEMS. Technical report, Los Alamos Report, unpublished.

Nie, X. B., Chen, S. Y., E, W. N., and Robbins, M. O. (2004). A continuum and molecular hybrid method for micro- and nano-fluid flow. *J. Fluid Mech.*, 500:55–64.

Nikunen, P., Karttunen, M., and Vattulainen, I. (2003). How would you integrate the equations of motion in dissipative particle dynamic simulations? *Computer Physics Communications*, 153:407–423.

Niu, X. Z., Tabeling, P., and Lee, Y. K. (2003). Finite time Lyapunov exponent for micro chaotic mixer design. In *Proccedings of IMECE'03, ASME, Washington, D.C., November 16-21*.

Noble, D. R., Chen, S., Georgiadis, J. G., and Buckius, R. O. (1995). A consistent hydrodynamic boundary condition for the lattice Boltzmann method. *Phys. Fluids*, 7:203–209.

Nomura, T. and Hughes, T. J. (1992). An arbitrary Lagrangian-Eulerian finite element method for interaction of fluid and a rigid body. *Comput. Methods Appl. Mech. Eng.*, 95:115.

Nose, S. (1984). A molecular dynamics method for simulations in the canonical ensemble. *Mol. Phys.*, 52:255–268.

O'Brien, R. W. and White, L. R. (1978). Electrophoretic mobility of a spherical colloidal particle. *J. Chem. Soc. Faraday Trans. 2*, 74:1607–1626.

O'Connell, S. T. and Thompson, P. A. (1995). Molecular dynamics-continuum hybrid computations: A tool for studying complex fluid flows. *Phys. Rev. E*, 52:R5792.

Oddy, M. H., Santiago, J. G., and Mikkelsen, J. C. (2001). Electrokinetic instability micromixing. *Anal. Chem.*, 73(24):5822–5832.

Ogrodzki, J. (1994). *Circuit Simulation Methods and Algorithms*. Boca Raton, Florida, CRC Press.

Ohshima, H. and Kondo, T. (1990). Electrokinetic flow between two parallel plates with surface charge layers: Electroosmosis and streaming potential. *J. Colloids and Interface Science*, 135(2):443–448.

Ohwada, T. and Sone, Y. (1992). Analysis of thermal stress slip flow and negative thermophoresis using the Boltzmann equation for hard-sphere molecules. *Eur. J. Mech., B/Fluids*, 11:389–414.

Ohwada, T., Sone, Y., and Aoki, K. (1989a). Numerical analysis of the Poiseuille and thermal transpiration flows between two parallel plates on the basis of the Boltzmann equation for hard sphere molecules. *Phys. Fluids A*, 1(12):2042–2049.

Ohwada, T., Sone, Y., and Aoki, K. (1989b). Numerical analysis of the shear and thermal creep flows of a rarefied gas over a plane wall on the basis of the linearized Boltzmann equation for hard sphere molecules. *Phys. Fluids*, 1:1588–1599.

Oldham, K. B. and Myland, J. C. (1994). *Fundamentals of Electrochemical Science*. Academic Press Inc: San Diego.

Omar, M. P., Mehregany, M., and Mullen, R. L. (1992). Electric and fluid field analysis of side-drive micromotors. *J. Microelectromech. Sys.*, 1(3):130–140.

O'Neill, M. E. and Majumdar, S. R. (1970). Asymmetrical slow viscous fluid motions caused by the translation or rotation of two spheres. Part i: The determination of exact solutions for any values of the ratio of radii and separation parameters. *Z ANGEW MATH PHYS*, 21(2):164–179.

Oran, E. S., Oh, C. K., and Cybyk, B. Z. (1998). Direct Simulation Monte Carlo: Recent advances and applications. *Ann. Rev. Fluid Mech.*, 30:403–441.

Oron, A. (2001). *Physics of thin films*. Chapter 10, The MEMS Handbook, edited by M. Gad-el-Hak, CRC Press.

Oron, A. and Bankoff, S. G. (1999). Dewetting of a heated surface by an evaporating liquid film under conjoining/disjoining pressures. *J. Colloid Interface Sci.*, 218:152–166.

Oron, A., Davis, S. H., and Bankoff, S. G. (1997). Long-scale evolution of thin liquid films. *Rev. Modern Phys.*, 68:931–980.

Oron, A. and Peles, Y. (1998). Stabilization of thin liquid films by internal heat generation. *Phys. Fluids A*, 10:537–539.

Orszag, S. A. and Yakhot, V. (1986). Reynolds number scaling of Cellular Automaton hydrodynamics. *Phys. Rev. Lett.*, 56:1691.

Ottino, J. M. (1997). *The Kinematics of Mixing: Stretching, Chaos, and Transport*. Cambridge University Press.

Ottino, J. M. and Wiggins, S. (2004). Introduction: Mixing in microfluidics. *Phil. Trans. R. Soc. London, Ser. A*, 362:923–935.

Overbeek, J. T. (1952). *Colloid Science, Volume 1, Editor: Kruyt, H.R.* Elsevier Publishing Company, Armsterdam.

Palusinski, O. A., Graham, A., Mosher, R. A., Bier, M., and Saville, D. A. (1986). Theory of electrophoretic separations, part II: Construction of a numerical simulation scheme and it's applications. *AICHE Journal*, 32(2):215–223.

Pan, F., Kubby, J., Peeters, E., Tran, A. T., and Mukherjee, S. (1998). Squeeze film damping effect on the dynamic response of a MEMS torsion mirror. *J. Micromech. Microeng.*, 8:200–208.

Panton, R. L. (1984). *Incompressible Fluid Flow*. Wiley, 2nd ed. New York.

Paranjpe, R. S. and Elrod, H. G. (1986). Stability of chains of permeable spherical beads in an applied magnetic field. *J. Appl. Phys.*, 60:418–422.

Park, J. H., Bahukudumbi, P., and Beskok, A. (2004). Rarefaction effects on shear driven oscillatory gas flows: A DSMC study in the entire Knudsen regime. *Phys. Fluids*, 16(2):317–330.

Patankar, N. and Hu, H. H. (1998). Numerical simulation of electroosmotic flow. *Anal. Chem.*, 70(9):1870–1881.

Paul, P. H., Graguilo, M. G., and Rakestraw, D. J. (1998). Imaging of pressure and electrokinetically driven flows through open capillaries. *Anal. Chem.*, 70(13):2459–2467.

Paul, S. and Chandra, A. (2003). Dynamics of water molecules at liquid-vapour interfaces of aqueous ionic solutions: Effects of ion concentration. *Chem. Phys. Lett.*, 373:87–93.

Pfahler, J. N., Harley, J. C., Bau, H. H., and Zemel, J. N. (1991). Gas and liquid flow in small channels. *ASME*, 32:49–59.

Pham-van-Diep, G., Keeley, P., Muntz, E. P., and Weaver, D. (1995). A micromechanical Knudsen compressor. In Lord, J. H. . G., editor, *Proceedings of the Ninenteenth International Symposium on Rarefied Gas Dynamics*, pages 715–721, Oxford University Press, Oxford U.K.

Phan, A. V., Gray, L. J., Kaplan, T., and Phan, T. N. (2002). The boundary contour method for two-dimensional Stokes flow and incompressible elastic materials. *Comp. Mech.*, 28:425–433.

Philip, J. R. (1972). Flows satisfying mixed no-slip and no-shear conditions. *J. Appl. Math. Phys.*, 23:353–372.

Piekos, E. S. and Breuer, K. (1995). DSMC modeling of micromechanical devices. In *AIAA Thermophysics Conference June 19-22 1995, San Diego, CA, AIAA 95-2089*.

Pit, R., Hervet, H., and Leger, L. (2000). Direct experimental evidence of slip at hexadecane: Solid interfaces. *Phys. Rev. Lett.*, 85(5):980–983.

Pivkin, I. (2005). *Continum and Atomistic Methods for Biological Flows*. PhD thesis, Brown University.

Pohl, H. A. (1978). *Dielectrophoresis*. Cambridge University Press, Cambridge.

Poiseuille, J. M. L. (1846). Experimental investigations upon the flow of liquids in tubes of very small diameters. *Sciences Mathematiques et Physiques*, 9:433–545.

Polard, W. G. and Present, R. D. (April 1948). On gaseous self-diffusion in long capillary tubes. *Phys. Rev.*, 73 (7):762–774.

Polson, N. A. and Hayes, M. A. (2000). Electroosmotic flow control of fluids on a capillary electrophoresis microdevice using an applied external voltage. *Anal. Chem.*, 72(5):1088–1092.

Pong, K. C., Ho, C. M., Liu, J., and Tai, Y. C. (1994). Non-linear pressure distribution in uniform microchannels. In *ASME, FED-Vol. 197, Application of Microfabrication to Fluid Mechanics*, pages 51–56.

Ponomarev, I. V. and Meyerovich, A. E. (2003). Surface roughness and effective stick-slip motion. *Phys. Rev. E*, 67:026302.

Poppe, H., Cifuentes, A., and Kok, W. T. (1996). Theoretical description of the influence of external radial fields on the electroosmotic flow in capillary electrophoresis. *Anal. Chem.*, 68:888–893.

Porodnov, B. T., Kulev, A. N., and Tuchvetov, F. T. (1978). Thermal transpiration in a circular capillary with a small temperature difference. *J. Fluid Mech.*, 88:609.

Porodnov, B. T. and Tuchvetov, F. T. (1979). Theoretical investigation of non-isothermal flow of a rarefied gas in a cylindrical capillary. *J. Eng. Phys.*, 36:61.

Pozhar, L. A. (1994). *Transport Theory of Inhomogenous Fluids*. World Scientific.

Pozhar, L. A. (2000). Structure and dynamics of nanofluids: Theory and simulations to calculate viscosity. *Phys. Rev. E*, 61(2):1432.

Pozhar, L. A. (2001). Virtual nanofabrication of electronic materials. *Computational Nanoscience,2001*, 3(9):188.

Priezjev, N. V. and Troian, S. M. (2004). Molecular origin and dynamic behavior of slip in sheared polymer flows. *Phys. Rev. Lett.*, 92(1):018302–1–018302–4.

Probstein, R. F. (1994). *Physiochemical Hydrodynamics: An Introduction*. John Wiley & Sons, Inc.

Promislow, J. H., Gast, A. P., and Fermigier, M. (1995). Aggregation kinetics of paramagnetic coloidal particles. *J. Chem. Phys.*, 102(13):5492–5498.

Puibasset, J. and Pellenq, R. (2003). Water adsorption on hydrophilic mesoporous and plane silica substrates: a grand canonical Monte-Carlo simulation study. *J. Chem. Phys.*, 118:5613–5622.

Qian, S. and Bau, H. H. (2002). A chaotic electroosmotic stirrer. *Anal. Chem.*, 74:3616–3625.

Qian, Y. H., D'Humières, D., and Lallemand, P. (1992). Lattice BGK models for Navier-Stokes equation. *Europhys. Lett.*, 17:479–482.

Qiao, R. and Aluru, N. R. (2002). A compact model for electroosmotic flows in microfluidic devices. *J. Micromech. Microeng.*, 12(5):625–635.

Qiao, R. and Aluru, N. R. (2003a). Dispersion control in nano-channel systems by localized zeta-potential variations. *Sens. Actuators, A-Physical*, 104(3):268–274.

Qiao, R. and Aluru, N. R. (2003b). Ion concentration and velocity in nanochannel electroosmotic flows. *J. Chem. Phys.*, 118(10):4692–4701.

Qiao, R. and Aluru, N. R. (2003c). Transient analysis of electro-osmotic transport by a reduced-order modeling approach. *Int. J. Numer. Methods Eng.*, 56:1023–1050.

Qiao, R. and Aluru, N. R. (2003d). A typical dependence of electroosmotic transport on surface charge in a single-wall carbon nanotube. *Nano Lett.*, 3(8):1013–1017.

Qiao, R. and Aluru, N. R. (2004). Charge inversion and flow reversal in a nanochannel electro-osmotic flow. *Phys. Rev. Lett.*, 92(19).

Quarles, T. (1989). The SPICE3 implementation guide. Technical Report No. UCB/ERL M89/44, University of California, Berkeley.

Quarles, T., Newton, A. R., Pederson, D. O., and Sangiovanni-Vincentelli, A. (1987). Spice 3b1 user's guide. *Univ. of California, Berkeley*.

Ramaswamy, D. and White, J. (2001). Automatic generation of small-signal dynamic macromodels from 3-d simulation. In *Modeling and Simulation of Microsystems*, pages 27–30.

Rapaport, D. C. (1997). *The Art of Molecular Dynamics Simulation*. Cambridge University Press, New York.

Ratulowski, J. and Chang, H.-C. (1989). Transport of air bubbles in capillaries. *Phys. Fluids A*, 1(10):1642–1655.

Ratulowski, J. and Chang, H.-C. (1990). Marangoni effects of trace impurities on the motion of long gas bubbles in capillaries. *J. Fluid Mech.*, 210:303–328.

Reed, L. (October 1993). Near term applications of microelectromechanical systems,. *4th International Symposium on Micro Machine and Human Science, Nagoya, Japan*, page 77.

Reed, L. D. and Morrison, F. A. (1976). Hydrodynamic interactions in electrophoresis. *J. Colloid Interface Sci.*, 54(1):117–133.

Reuss, F. (1809). Sur un nouvel effet de l'électricité galvanique. *Mémoires de la Société Impériale de Naturalistes de Moscou*, 2:327–337.

Revenga, M., Espanol, P., and Zuniga, I. (1999). Boundary conditions in dissipative particle dynamics. *Computer Physics Communications*, 121-122:309–311.

Rewienski, M. and White, J. (2001). A trajectory piecewise-linear approach to model order reduction and fast simulation of nonlinear circuits and micromachined devices. In *Proceedings of ICCAD*, pages 252–257.

Rewienski, M. and White, J. (2002). Improving trajectory piecewise-linear approach to nonlinear model order reduction for micromachined devices using an aggregated projection basis. In *Modeling and Simulation of Microsystems*, pages 128–131.

Reyes, D. R., Lossifidis, D., Auroux, P., and Manz, A. (2002). Micro total analysis systems. 1. Introduction, theory, and technology. *Anal. Chem.*, 74:2623–2636.

Reynolds, O. (1879). On certain dimensional properties of matter in the gaseous state. Part I. Experimental researches on thermal transpiration of gases through porous plates and on the laws of transpiration and impulsion, including an experimental proof that gas is not a continuous plenum. Part II. On an extension of the dynamical theory of gas, which includes the stresses, tangential and normal, caused by a varying condition of gas, and affords an explanation of the phenomena of transpiration and impulsion. *Phil. Trans. Royal Society London*, B 170:727–845.

Rice, C. L. and Whitehead, R. (1965). Electro kinetic flow in a narrow cylindrical capillary. *J. Phys. Chem.*, 69(11):4017–4023.

Richardson, S. (1973). On the no-slip boundary condition. *J. Fluid Mech.*, 59:707.

Richetti, P., Prost, J., and Barois, P. (1984). Two-dimensional aggregation and crystallization of a colloidal suspension of latex spheres. *J. Phys. Lett.*, 45:1137–1143.

Righetti, P., Gelfi, C., Verzola, B., and Castelletti, L. (2001). The state of art of dynamic coatings. *Electrophoresis*, 22:603–611.

Righetti, P. G. (1983). *Isoelectric Focussing: Theory, Methodology and Applications*. Elsevier Biomedical, Amsterdam.

Ristenpart, W. D., Aksay, I. A., and Saville, D. A. (2004). Assembly of colloidal aggregates by electrohydrodynamic flow: Kinetic experiments and scaling analysis. *Phys. Rev. E*, 69(021405).

Rittger, E. (1990a). Can three-atom potentials be determined from thermodynamic data? *Mol. Phys.*, 69:867–894.

Rittger, E. (1990b). The chemical potential of liquid xenon by computer simulation. *Mol. Phys.*, 69:853–865.

Rittger, E. (1990c). An empirical three-atom potential for xenon. *Mol. Phys.*, 71:79–96.

Romero, L. A. and Yost, F. G. (1996). Flow in an open channel capillary. *J. Fluid Mech.*, 322:109–129.

Ronceray, M. P. (1911). Recherches sur l'ecoulement dans les tubes capillaires. *Annales de Chimie et de Physique*, 22:107–125.

Rosenfeld, Y. (1993). Free energy model for inhomogeneous fluid mixtures; Yukawa charged hard spheres, general interactions, and plasmas. *J. Chem. Phys.*, 98:8126–8148.

Rosenweig, R. E. (1987). Magnetic fluids. *Ann. Rev Fluid Mech.*, 19:437–463.

Rothe, D. (1971). Electron-beam studies of viscous flow in supersonic nozzles. *AIAA Journal*, 9(5):804–811.

Roveda, R., Goldstein, D. B., and Varghese, P. L. (1998). Hybrid Euler/Particle approach for continuum/rarefied flows. *J. Spacecraft and Rockets*, 35 (3):258–265.

Rovere, M. and Gallo, P. (2003). Strong layering effects and anomalous dynamical behaviour in confined water at low hydration. *J. Phys. Condens. Matter*, 15:S145–S150.

Rovere, M., Ricci, M. A., and Bruni, F. (1998). A molecular dynamics simulation of water confined in a cylindrical SiO2 pore. *J. Chem. Phys.*, 108:9859–9867.

Rowlinson, J. S. (1989). The Yukawa potential. *Physica A*, 156:15–34.

Ruckenstein, E. and Rajora, P. (1983). On the no-slip condition of hydrodynamics. *J. Colloid Interface Sci.*, 96:488–491.

Rudisill, E. N. and Cummings, P. T. (1989). Gibbs ensemble simulation of phase equilibrium in the hard core two-Yukawa fluid model for the Lennard-Jones fluid. *Mol. Phys.*, 68:629–635.

Russel, W. B., Saville, D. A., and Scholwalter, W. R. (1989). *Colloidal Dispersions*. Cambridge Univ. Press.

Sadr, R., Yoda, M., Zheng, Z., and Conlisk, A. T. (2004). An experimental study of electro-osmotic flow in rectangular microchannels. *J. Fluid Mech.*, 506:357–367.

Sadus, R. J. (1999). *Molecular Simulation of Fluids: Theory, Algorithms and Object-orientation*. Elsevier.

Saito, R., Dresselhaus, C., and Dresselhaus, M. S. (1998). *Physical Properties of Carbon Nanotubes*. Imperial College Press.

Sammarco, T. A. and Burns, M. A. (1999). Thermocapillary pumping of discrete drops in microfabricated analysis devices. *AIChE J.*, 45(2):350–366.

Santiago, J. G. (2001). Electroosmotic flows in microchannels with finite inertial and pressure forces. *Anal. Chem.*, 73(10):2353–2365.

Santiago, J. G., Werely, S. T., Meinhart, C. D., Beebe, D., and Adrian, R. (1998). A PIV system for microfluidics. *Exp. Fluids*, 25:316–319.

Sattler, R., Schrag, G., and Wachutka, G. (2003). Mixed-level model for highly perforated torsional actuators coupling the mechanical, the electrostatic and the fluidic domain. In *Nanotech 2003*, pages 284–287.

Saur, M., Angerer, B., Ankenbauer, W., Foldes-Papp, Z., Gobel, F., Han, K. T., Rigler, R., Schulz, A., Wolfrum, J., and Zander, C. (2001). Single molecule DNA sequencing in submicrometer channels: State of the art and future prospects. *J. Biotechnol.*, 86(3):181–201.

Schaaf, S. A. and Chambre, P. L. (1961). *Flow of Rarefied Gases*. Princeton University Press, Princeton.

Schamberg, R. (1947). *The Fundamental Differential Equations and the Boundary Conditions for High Speed Slip-Flow, and Their Application to Several Specific Problems*. PhD thesis, California Institute of Technology.

Schasfoort, R. B., Schlautmann, S., Hendrikse, J., and Berg, A. V. (2001). Electroosmotic flow in a microcapillary with one solution displacing another solution. *J. Colloid Interface Sci.*, 242:264–271.

Schmidt, K. E. and Lee, M. A. (1991). Implementing the fast multipole method in three dimensions. *J. Stat. Phys.*, 63:1223–1235.

Schnell, E. (1956). Slippage of water over nonwettable surfaces. *J. Appl. Phys.*, 27(1):1149–1152.

Schrag, G., Voigt, P., and Wachutka, G. (2001). Squeeze film damping in arbitrary shaped microdevices modeled by an accurate mixed level scheme. In *Modeling and Simulation of Microsystems*, pages 92–95.

Schrag, G. and Wachutka, G. (2002). Physically based modeling of squeeze film damping by mixed-level system simulation. *Sens. Actuators, A*, 97-98:193–200.

Seidl, M. and Steinheil, E. (1974). Measurement of momentum accomodation coefficients on surfaces characterized by auger spectroscopy, SIMS and LEED. In *Proceedings of the Nineth International Symposium on Rarefied Gas Dynamics*, pages E9.1–E9.2.

Senapati, S. and Chandra, A. (2001). Dielectric constant of water confined in a nanocavity. *J. Phys. Chem. B*, 105:5106–5109.

Senturia, S., Aluru, N. R., and White, J. (1997). Simulating the behavior of MEMS devices: Computational methods and needs. *IEEE Computational Science & Engineering*, 4 (January-March):30–43.

Senturia, S. D. (1998a). Simulation and design of microsystems: a 10-year perspective. *Sens. Actuators, A*, 70:1–7.

Senturia, S. D. (1998b). CAD challenges for microsensors, microactuators and microsystems. *IEEE Proceedings*, pages 1611–1626.

Sert, C. and Beskok, A. (2002). Time-periodic forced convection in micro heat spreaders. *Numerical Heat Transfer: A*, 42(7):685 – 705.

Shames, I. H. and Dym, C. L. (1985). *Energy and finite element methods in structural dynamics*. McGraw-Hill, New York.

Shanahan, M. E. R. (1988). Statics and dynamics of wetting on thin solids. *Rev. Phys. Appl.*, 33:1031–1037.

Shapiro, B., Moon, H., Garrell, R. L., and Kim, C.-J. (2003a). Equilibrium behavior of sessile drops under surface tension, applied external fields, and material variations. *J. Appl. Phys.*, 93:5794–5811.

Shapiro, B., Moon, H., Garrell, R. L., and Kim, C.-J. (2003b). Modeling of electrowetted surface tension for addressable microfluidic systems: Dominant physical effects, material dependences, and limiting phenomena. In *EEE The Sixteenth Annual International Conference on MEMS*, pages 201–205.

Shardlow, T. (2003). Splitting for dissipative particle dynamics. *SIAM J. Sci. Comput.*, 24(4):1267–1282.

Sharipov, F. and Sleznev, V. (1998). Data on internal rarefied gas flows. *J. Phys. Chem. Ref. Data*, 27, No 3:657–706.

Shaw, D. J. (1980). *Introduction to Colloid and Surface Chemistry*. Academic Press, New York.

Shen, C., Fan, J., and Xie, C. (2003). Statistical simulation of rarefied gas flows in micro-channels. *J. Comp. Phys.*, 189:512–526.

Sherman, F. S. (1990). *Viscous Flow*. McGraw-Hill, New York.

Shi, F. (1995). *Simulation and Analysis of MEMS with Applications of Sensitivity Analysis and Optimization*. PhD thesis, Cornell University.

Siewert, C. E. (2000). Poiseuille and thermal-creep flow in a cylindrical tube. *J. Comp. Phys.*, 160:470–480.

Silvaco International (1995). *ATLAS User's Manual: MixedMode*.

Simek, O. and Hadjiconstantinou, N. G. (2002). Constant-wall-temperature Nusselt number in micro and nano-channels. *J. Heat Transfer*, 124:356–364.

Singh, A., Cummings, E. B., and Throckmorton, D. J. (2001). Flourescent liposome flow markers for microscale particle-image velocimetry. *Anal. Chem.*, 73(5):1057–1061.

Sinnott, S. B. (2002). Chemical functionalization of carbon nanotubes. *Journal of Nanoscience and Nanotechnology*, 2(2):113–123.

Sinton, D. and Li, D. (2003). Electroosmotic velocity profiles in microchannels. *Colloids Surf., A: Physicochem. Eng. Aspects*, 222:273–283.

Sirisup, S. and Karniadakis, G. E. (2004). A spectral viscosity method for correcting the long-term behavior of pod models. *J. Comp. Phys.*, 194:92–116.

Sirovich, L. (1987). Turbulence and the dynamics of coherent structures. *Quart. Appl. Math.*, 45:561–571.

Skordos, P. A. (1993). Initial and boundary conditions for the lattice Boltzmann method. *Phys. Rev. E*, 48:4823–42.

Smith, B., Petter, B., and Gropp, W. (1996). *Domain Decomposition*. Cambridge University Press, Cambridge.

Soderman, O. and Jonsson, B. (1996). Electroosmosis: Velocity profiles in different geometries with both temporal and spatial resolution. *J. Chem. Phys.*, 105(23):10300–10311.

Sokhan, V. P., Nicholson, D., and Quirke, N. (2001). Fluid flow in nanopores: An examination of hydrodynamic boundary conditions. *J. Chem. Phys.*, 115(8):3878–3887.

Solomentsev, Y., Bohmer, M., and Anderson, J. L. (1997). Particle clustering and pattern formation during electrophoretic deposition: A hydrodynamic model. *Langmuir*, 13:6058–6068.

Solomentsev, Y., Guelcher, S. A., Bevan, M., and Anderson, J. L. (2000). Aggregation dynamics for two particles during electrophoretic deposition under steady fields. *Langmuir*, 16:9208–9216.

Somers, S. A. and Davis, H. T. (1991). Microscopic dynamics of fluids confined between smooth and atomically structures solid surfaces. *J. Chem. Phys.*, 96(7):5389–5407.

Sone, Y. (1964). Kinetic theory analysis of linearized Rayleigh problem. *J. Phys. Soc. Japan*, 19(8):1463–1473.

Sone, Y. (1965). Effect of sudden change of wall temperature in rarefied gas. *J. Phys. Soc. Japan*, 20(2):222–229.

Sone, Y. (1969). Asymptotic theory of flow of a rarefied gas over a smooth boundary, I. In *Rarefied Gas Dynamics, eds. L. Trilling and H.Y. Wachman, vol. I*, pages 243–253, Academic Press, New York.

Sone, Y. (1971). Asymptotic theory of flow of a rarefied gas over a smooth boundary, II. In *Rarefied Gas Dynamics, ed. D. Dini, vol. II*, pages 737–749, Editrice Tecnico Scientifica, Pisa.

Sone, Y. (1972). Flow induced by thermal stress in rarefied gas. *Phys. Fluids*, 15:1418–1423.

Sone, Y. (1989). Analytical and numerical studies of rarefied gas flows on the basis of the Boltzmann equation for hard sphere molecules. *Phys. Fluids A*, 1(12):2042–2049.

Sone, Y. (2000). Flows induced by temperature fields in a rarefied gas and their ghost effect on the behavior of a gas in the continuum limit. *Annu. Rev. Fluid Mech.*, 32:779–811.

Sone, Y. (2002). *Kinetic Theory and Fluid Dynamics*. Birkhauser.

Sone, Y. and Aoki, K. (1994). *Molecular Gas Dynamics*. Asakura, Tokyo (in Japanese).

Sone, Y., Aoki, K., Takata, S., Sugimoto, H., and Bobylev, A. V. (1996a). Inappropriateness of the heat-conduction equation for description of a temperature field of a stationary gas in the continuum limit: Examination by asymptotic analysis and numerical computation of the Boltzmann equation. *Phys. Fluids*, 8:628–638. Erratum, 1996, 8:841.

Sone, Y., Bardos, C., and Sugimoto, H. (2000). Asymptotic theory of the Boltzmann system for a steady flow of a slightly rarefied gas with a finite Mach number: General theory. *Eur. J. Mech., B/Fluids*, 19:325.

Sone, Y., Fukuda, T., Hokazono, T., and Sugimoto, H. (2001). Experiment on a one-way flow of a rarefied gas through a straight circular pipe without average temperature and pressure gradients. In *Rarefied Gas Dynamics, eds. T.J. Bartel & M. Galiss*, volume AIP, Melville.

Sone, Y. and Hasegawa, M. (1987). Poiseuille and thermal transpiration flows of a rarefied gas through a rectangular pipe. *J. Vac. Soc. of Japan (in Japanese)*, 30 (5):425–428.

Sone, Y., Takata, S., and Ohwada, T. (1990). Numerical analysis of the plane Couette flow of a rarefied gas on the basis of the linearized Boltzmann equation for hard-sphere molecules. *Eur. J. Mech., B/Fluids*, 9:273–288.

Sone, Y., Waniguchi, Y., and Aoki, K. (1996b). One-way flow of a rarefied gas induced in a channel with periodic temperature distribution. *Phys. Fluids*, 8:2227.

Sone, Y. and Yoshimoto, M. (1997). Demonstration of a rarefied gas flow induced near the edge of a uniformly heated plate. *Phys. Fluids*, 9:3530–3534.

Sparrow, E. M., Lundgren, T. S., and Lin, S. H. (1962). Slip flow in the entrance region of a parallel channel. In *Proc. Heat Transfer and Fluid Mechanics Institute, Stanford*, pages 223–238.

Spikes, H. and Granick, S. (2003). Equation for slip of simple liquids at smooth solid surfaces. *Langmuir*, 19:5065–5071.

Spoel, D., Buuren, A., Apol, E., Meulenhoff, P., Tieleman, D., Sijbers, A., Hess, B., Feenstra, K., Lindahl, E., Drunen, R., and Berendsen, H. (2001). *Gromacs User Manual version 3.0*. Nijenborgh 4, 9747 AG Groningen, The Netherlands. Internet: http://www.gromacs.org.

Spohr, E., Hartnig, C., Gallo, P., and Rovere, M. (1999). Water in porous glasses. a computer simulation study. *J. Mol. Liquids*, 80:165–178.

Spohr, E., Trokhymchuk, A., and Henderson, D. (1998). Adsorption of water molecules in slit pore. *J. Electroanal. Chem.*, 450:281–287.

Sreekanth, A. K. (1969). Slip flow through long circular tubes. *Proceedings of the Sixth International Symposium on Rarefied Gas Dynamics, Edited by L. Trilling and H.Y. Wachman, Academic Press*, 1:667–680.

Srinivasan, V., Jog, A., and Fair, R. B. (2001). Scalable macromodels for microelectromechanical systems. In *Modeling and Simulation of Microsystems*, pages 72–75.

Steindl, A. and Troger, H. (2001). Methods for dimension reduction and their application in nonlinear dynamics. *Intl. Journal of Solids and Structures*, 38:2131–2147.

Stevens, M. J., Mondello, M., Grest, G. S., Cui, S. T., Cochran, H. D., and Cummings, P. T. (1997). Comparison of shear flow of hexadence in a confined geometry. *J. Chem. Phys.*, 106:7303–7314.

Stillinger, F. H. (1973). Structure in aqueous solutions of nonpolar solutes from the standpoint of scaled-particle theory. *J. Solut. Chem.*, 2:141–158.

Stillinger, F. H. and Rahman, A. (1974). Improved simulation of liquid water by molecular dynamics. *J. Chem. Phys.*, 60:1545–1557.

Stimson, M. and Jeffery, G. B. (1926). The motion of two spheres in a viscous fluid. *Proc. Roy. Soc.*, 111:110–116.

Stone, A. J. (1996). *Theory of Intermolecular Forces*. Clarendon Press, Oxford.

Stone, H. A., Stroock, A. D., and Ajdari, A. (2004). Engineering flows in small devices: Microfluidics toward a lab-on-a-chip. *Ann. Rev. Fluid Mech.*, 34:381–411.

Strantton, J. A. (1941). *Electromagnetic Theory*. McGraw Hill, New York.

Strook, A. D., Dertinger, S. K., Ajdari, A., Mezic, I., Stone, H. A., and Whitesides, G. M. (2002). Chaotic mixer for microchannels. *Science*, 295:647–651.

Succi, S. (2001). *The Lattice Boltzmann Equation - For Fluid Dynamics and Beyond*. Oxford University Press.

Succi, S., Karlin, I. V., and Chen, H. (2002). Colloquium: Role of the H theorem in lattice Boltzmann hydrodynamic simulations. *Rev. Mod. Phys.*, 74:1203–1220.

Sui, H., Han, B., Lee, J. K., Walian, P., and Jap, B. K. (2001). Structural basis of water-specific transport through the AQP1 water channel. *Nature*, 414:872–878.

Sun, L. and Crooks, R. M. (2000). Single carbon nanotube membranes: A well-defined model for studying mass transport through nanoporous materials. *J. Am. Chem. Soc.*, 122(49):2340–12345.

Sun, Q. and Boyd, I. D. (2002). A direct simulation method for subsonic, microscale gas flows. *J. Comp. Phys.*, 179:400–425.

Sun, Q. and Boyd, I. D. (2004). Flat-plate aerodynamics at very low Reynolds number. *J. Fluid Mech.*, 502:199–206.

Sun, Q., Boyd, I. D., and Candler, G. V. (2004). A hybrid continuum/particle approach for modeling subsonic, rarefied gas flows. *J. Comp. Phys.*, 194:256–277.

Svishchev, I. M., Kusalik, P. G., Wang, J., and Boyd, R. (1996). Polarizable point-charge model for water: Results under normal and extreme conditions. *J. Chem. Phys.*, 105:4742–4750.

Swaminathan, T. N. and Hu, H. H. (2004). Particle interactions in electrophoresis due to inertia. *J. Colloid Interface Sci.*, 273(1):324–330.

Szeri, A. Z. (1998). *Fluid Film Lubrication : Theory and Design.* Cambridge University Press, New York.

Tabor, D. (1991). *Gases, Liquids and Solids.* Cambridge Univ. Press, (3rd edition) edition.

Tagawa, N. (1993). State of the art for flying head slider mechanisms in magnetic recording disk. *Wear*, 168:43.

Tai, Y. C., Fan, L. S., and Muller, R. S. (Salt Lake City, UT, February 1989). IC-processed micro-motors: design, technology, and testing. *IEEE Micro Electro Mechanical System Workshop.*

Takhistov, P., Indeikina, A., and Chang, H.-C. (2002). Electrokinetic displacement of air bubbles in microchannels. *Phys. Fluids*, 14(1):1–14.

Talanquer, V. (1997). A new phenomenological approach to gas-liquid nucleation based on the scaling properties of the critical nucleus. *J. Chem. Phys.*, 106(23):9957–9960.

Tan, M.-L., Fischer, J. T., Chandra, A., Brooks, B. R., and Ichiye, T. (2003). A temperature of maximum density in soft sticky dipole water. *Chem. Phys. Lett.*, 376:646–652.

Tang, C. W., Nguyen, T. H., and Howe, T. R. (1989). Laterally driven polysilicon resonant microstructures. *Sens. Actuators*, 20:25–32.

Tang, G. Y., Yang, C., Chai, J. C., and Gong, H. Q. (2004a). Joule heating effect on electroosmotic flow and mass species transport in a microcapillary. *Int. J. Heat Mass Transfer*, 47:215–227.

Tang, G. Y., Yang, C., Chai, J. C., and Gong, H. Q. (2004b). Numerical analysis of the thermal effect on electroosmotic flow and electrokinetic mass transport in microchannels. *Analytica Chimica Acta*, 507:27–37.

Tang, X. Z. and Boozer, A. H. (1996). Finite time Lyapunov exponent and advection-diffusion equation. *Phys. D*, 95:283–305.

Tanner, L. H. (1979). The spreading of silicone oil drops on horizontal surfaces. *J. Phys. D*, 12:1473–1484.

Tao, R. and Sun, J. M. (1991). Three-dimensional structure of induced electrorheological solid. *Phys. Rev. Lett.*, 67:398.

Technology Modeling Associates (1997). *MEDICI User's Manual: Circuit Analysis.*

Tehver, R., Toigo, F., Koplik, J., and Banavar, J. R. (1998). Thermal walls in computer simulations. *Phys. Rev. E*, 57 (1):R17–R20.

Tell, J. L. and Maris, H. J. (1983). Specific heats of hydrogen, deuterium, and neon in porous vycor glass. *Phys. Rev. B*, 28:5122–5125.

Telleman, P., Larsen, U. D., Philip, J., Blankenstein, G., and Wolff, A. (1998). Cell sorting in microfluidic systems. In *Micro Total Analysis Systems '98, Ed. Harrison & van den Berg, Kluwer*, pages 39–44.

Terray, A., Oakey, J., and Marr, D. (2002). Microfluidic control using colloidal devices. *Science*, 296:1841–1843.

Tersoff, J. (1988a). Empirical interatomic potential for carbon, with applications to amorphous carbon. *Phys. Rev. Lett.*, 61:2879–2882.

Tersoff, J. (1988b). New empirical approach for the structure and energy of covalent systems. *Phys. Rev. B*, 37:6991–7000.

Thompson, P. and Troian, S. (1997). A general boundary condition for liquid flow at solid surfaces. *Nature*, 389:360–362.

Thompson, P. A. (1988). *Compressible Fluid Dynamics*. McGraw Hill, New York.

Thompson, P. A. and Robbins, M. O. (1990). Shear flow near solids: Epitaxial order and flow boundary conditions. *Phys. Rev. A*, 41(12):6830–6837.

Thompson, S. L. and Owens, W. R. (1975). A survey of flow at low pressures. *Vacuum*, 25:151–156.

Thorsen, T., Maerkl, S. J., and Quake, S. R. (2002). Microfluidic large-scale integration. *Science*, 298:580–584.

Tilmans, H. A. (1996). Equivalent circuit representation of electromechanical transducers: I. Lumped-parameter systems. *J. Micromech. Microeng.*, 6:157–176.

Tilmans, H. A. (1997). Equivalent circuit representation of electromechanical transducers: II. Distributed-parameter systems. *J. Micromech. Microeng.*, 7:285–309.

Timoshenko, S. and Woionowsky-Krieger, S. (1959). *Theory of Plates and Shells*. McGraw-Hill Book Company: London.

Tison, S. A. (1993). Experimental data and theoretical modeling of gas flows through metal capillary leaks. *Vacuum*, 44:1171–1175.

Tison, S. A. (1995). Private communications. *NIST*.

Todd, B. D., Evans, D. J., and Davis, P. J. (1995). Pressure tensor for inhomogeneous fluids. *Phys. Rev. E*, 52:1627–1638.

Tomboulides, A. G., Israeli, M., and Karniadakis, G. E. (1989). Efficient removal of boundary-divergence errors in time-splitting methods. *J. Sci. Comp.*, 4:291.

Toney, M. F., Howard, J. N., Richer, J., Borges, G. L., Gordon, J. G., Melroy, O. R., Wiesler, D. G., Yee, D., and Sorensen, L. B. (1994). Voltage-dependent ordering of water molecules at an electrode/electrolyte interface. *Nature*, 368:444–446.

Toxvaerd, S. (1981). The structure and thermodynamics of a solid-fluid interface. *J. Chem. Phys.*, 74(3):1998–2005.

Trau, M., Saville, D. A., and Aksay, I. A. (1996). Field-induced layering of colloidal crystals. *Science*, 272:706–709.

Trau, M., Saville, D. A., and Aksay, I. A. (1997). Assembly of colloidal crystals at electrode interfaces. *Langmuir*, 13:6375–6381.

Traube, J. and Whang, S.-H. (1928). Uber Reibungskonstante und Wandschicht. *Z. Physikal. Chem. A*, 138:102–122.

Travis, K. P. and Evans, D. J. (1996). Molecular spin in a fluid undergoing Poiseuille flow. *Phys. Rev. E*, 55(2):1566–1572.

Travis, K. P. and Gubbins, K. E. (2000). Poiseuille flow of Lennard-Jones fluids in narrow slit pores. *J. Chem. Phys.*, 112(4):1984–1994.

Travis, K. P., Todd, B. D., and Evans, D. J. (1997). Departure from Navier Stokes hydrodynamics in confined liquids. *Phys. Rev. E*, 55(4):4288–4295.

Tretheway, D. C. and Meinhart, C. D. (2002). Apparent fluid slip at hydrophobic microchannel walls. *Phys. Fluids*, 14(3):L9–L12.

Trimmer, W. (1997). *Micromechanics and MEMS, Classic and Seminal Papers to 1990*. IEEE Press.

Troger, H. and Steindl, A. (1991). *Non-Linear Stability and Bifurcation Theory: An Introduction for Engineers and Applied Scientists*. Springer, New York.

Tryggvason, G., Bunner, B., Ebrat, O., and Tauber, W. (1998). Computations of multiphase flows by a finite difference/front tracking method. In *29th Computational Fluid Dynamics, Lecture Series, von Karman Institute*.

Tseng, W. L. and Chang, H. T. (2001). A new stategy for optimizing sensitivity, speed, and resolution in capillary electrophoretic separation of DNA. *Electrophoresis*, 22:763–770.

Tunc, G. and Bayazitoglu, Y. (2002). Heat transfer in rectangular microchannels. *Int. J. Heat Mass Transfer*, 45(4):765–773.

Turowski, M., Chen, Z., and Przekwas, A. (1998). Squeeze film behavior in MEMS for large amplitude motion - 3D simulations and non-linear circuit/behavioral models. In *IEEE/VIUF Intl. Conf. BMAS'98*.

Tyrrell, J. and Attard, P. (2002). Atomic force microscope images of nanobubbles on a hydrophobic surface and corresponding force-separation data. *Langmuir*, 18:160–167.

Tysanner, M. W. and Garcia, A. L. (2004). Measurement bias of fluid velocity in molecular simulations. *J. Chem. Phys.*, 196:173–183.

Unger, M. A., Chou, H.-P., Thorsen, T., Scherer, A., and Quake, S. R. (2000). Monolithic microfabricated valves and pumps by multilayer soft lithography. *Science*, 288:113–116.

Urbanek, W., Zemel, J. N., and Bau, H. H. (1993). An investigation of the temperature dependence of Poiseuille numbers in microchannel flow. *J. Micromech. Microeng.*, 3:206–208.

van der Spoel, D., Lindahl, E., Hess, B., van Buuren, A. R., Apol, E., Meulenhoff, P. J., Tieleman, D. P., Sijbers, A. L. T. M., Feenstra, K. A., van Drunen, R., and Berendsen, H. J. C. (2004). *Gromacs User Manual version 3.2*. www.gromacs.org.

van der Spoel, D., van Maaren, P. J., and Berendsen, H. J. (1998). A systematic study of water models for molecular simulation: derivation of water models optimized for use with a reaction field. *J. Chem. Phys.*, 108(24):10220–10230.

van Kampen, R. P. (1995). *Bulk-Micromachinend Capacitive Servo-Accelerometer*. PhD thesis, Technical University of Delft, Delft.

Vandemeer, J. E., Kranz, M. S., and Fedder, G. K. (1998). Hierarchical representation and simulation of micromachined inertial sensors. In *Modeling and Simulation of Microsystems*.

Varghese, M., Rabinovich, V. L., and Senturia, S. D. (1999). Reduced-order modeling of Lorentz force actuation with modal basis functions. In *Modeling and Simulation of Microsystems*, pages 155–158.

Vargo, S. E. and Muntz, E. P. (1996). A simple micromechanical compressor and vacuum pump for flow control and other distributed applications. In *Thirty Fourth Aerospace Sciences Meeting and Exhibit January 15-18 1996, Reno, NV, AIAA 96-0310*.

Vargo, S. E., Muntz, E. P., Shiflett, G. R., and Tang, W. C. (1998). Knudsen compressor as a micro- and macroscale vacuum pump without moving parts or fluids. *J. Vac. Sci. Technol. A-Vacuum Surfaces and Films Part 2*, 17(4):2308–2313.

Vasilyev, D., Rewienski, M., and White, J. (2003). A TBR-based trajectory piecewise-linear algorithm for generating accurate low-order models for non-linear analog circuits and MEMS. In *Proceedings of Design Automation Conference*, pages 490–495.

Veijola, T. (1999). Equivalent circuit models for micromechanical inertial sensors. Technical report, Helsinki University of Technology, Circuit Theory Laboratory, CT-39.

Veijola, T. (2000). Compact damping models for lateral structures including gas rarefaction effects. In *Proceedings of MSM 2000*, pages 162–165, San Diego.

Veijola, T. (2001). Acoustic impedence elements modeling oscillating gas flow in micro channels. In *Modeling and Simulation of Microsystems*, pages 96–99.

Veijola, T., Kuisma, H., and Lahdenperä, J. (1998). The influence of gas-surface on gas film damping in a silicon accelerometer. *Sens. Actuators, A*, 66:83–92.

Veijola, T., Kuisma, H., Lahdenperä, J., and Ryhänen, T. (1995a). Equivalent-circuit model of the squeezed gas film in a silicon accelerometer. *Sens. Actuators, A*, 48:239–248.

Veijola, T., Ryhänen, T., Kuisma, H., and Lahdenperä, J. (1995b). Circuit simulation model gas damping in microstructures with nontrivial geometries. In *Proceedings of Transducers'95 & Eurosensors IX, Stockholm, Sweden, June 25-29*, pages 36–39.

Veijola, T. and Turowski, M. (2001). Compact damping models for laterally moving microstructures with gas-rarefaction effects. *J. Microelectromech. Sys.*, 10:263–273.

Velev, O. D., Prevo, B. G., and Bhatt, K. H. (2003). Oc-chip manipulation of free droplets. *Nature*, 426:515–516.

Vergeles, M., Keblinski, P., Koplik, J., and Banavar, J. R. (1996). Stokes drag and lubrication flows: A molecular dynamics study. *Phys. Rev. E*, 53(5):4852–4864.

Verheijen, H. J. and Prins, M. W. (1999). Reversible electrowetting and trapping of charge: model and experiments. *Langmuir*, 15:6616–6620.

Vijayakumar, P., Sun, Q., and Boyd, I. D. (1999). Vibrational-translational energy exchange models for the direct simulation Monte Carlo method. *Phys. Fluids*, 11 (8):2117–2126.

Vincenti, W. G. and Kruger, C. H. (1977). *Introduction to Physical Gas Dynamics*. Robert E. Krieger Publishing Company, Huntington, New York.

Vinogradova, O. I. (1995). Drainage of a thin liquid film confined between hydrophobic surfaces. *Langmuir*, 11:2213–2220.

Vinogradova, O. I. (1996). Hydrodynamic interaction of curved bodies allowing slip on their surfaces. *Langmuir*, 12:5963–5968.

Vinogradova, O. I. (1999). Slippage of water over hydrophobic surfaces. *Int. J. Miner. Process.*, 56:31–60.

Voigt, P. and Wachutka, G. (1997). Electrofluidic microsystem modeling based on Kirchoffian network theory. In *Transducers 1997*, pages 1019–1022.

Volpert, M., Mezic, I., Meinhart, C. D., and Dahleh, M. (1999). An actively controlled micromixer. In *Proccedings of the ASME, MEMS, pp. 483-487, Nashville, TN*.

von Smoluchowski, M. (1916). Drei vortrage uber diffusion, Brownsche molekularbewegung und koagulation von kolloidteilchen. *Z. Phys.*, 17:557–585.

Wadsworth, D. C. and Erwin, D. A. (1992). Two-dimensional hybrid continuum/particle approach for rarefied flows. *AIAA*, 92-2975.

Waghe, A., Rasaiah, J. C., and Hummer, G. (2002). Filling and emptying kinetics of carbon nanotubes in water. *J. Chem. Phys.*, 117:10789–10795.

Wagner, A. J. and Pagonabarraga, I. (2002). Lees-Edwards boundary conditions for Lattice Boltzmann. *J. Stat. Phys.*, 107:521–537.

Walther, J. H., Jaffe, R., Halicioglu, T., and Koumoutsakos, P. (2001a). Carbon nanotubes in water: Structure characteristics and energies. *J. Phys. Chem. B*, 105:9980–9987.

Walther, J. H., Jaffe, R., Halicioglu, T., and Koumoutsakos, P. (2001b). Hydrophobic hydration of carbon nanotubes. Technical report, ETH, Zurich, Switzerland.

Washburn, E. W. (1921). The dynamics of capillary flow. *Phys. Rev.*, 17(3):273–283.

Wasserman, S. R., Whitesides, G. M., Tidswell, I. M., Ocko, B. M., Pershan, P. S., and Axe, J. D. (1989). The structure of self-assembled monolayers of alkylsiloxanes on silicon - a comparison of results from ellipsometry and low-angle x-ray reflectivity. *J. Am. Chem. Soc.*, 111(15):5852–5861.

Weighardt, K. E. (1953). On the resistance of screens. *The Aeronautical Quarterly*, 4:186–192.

Weigl, B. H., Bardell, R. L., and Cabrera, C. R. (2003). Lab-on-a-chip for drug development. *Advanced Drug Delivery Reviews*, 55:349–377.

Welder, T. W., Chapman, D. R., and MacCormack, R. W. (1993). Evaluation of various forms of the Burnett equations. In *AIAA Fluid Dynamics Conference July 6-9, 1993, Orlando FL, AIAA 93-3094*.

Wen, S. B. and Lai, C. L. (2003). Theoretical analysis of flow passing a single sphere moving in a micro-tube. *Proc. R. Soc. London, A*, 459:495–526.

Wendl, M. C. and Agarwal, R. K. (2002). Viscous dissipation in finite thin-gap Couette devices. *J. Heat Transfer*, 124:200–203.

Werder, T., Walther, J. H., Jaffe, R. L., Halicioglu, T., and Koumoutsakos, P. (2003). On the water-carbon interaction for use in molecular dynamics simulations of graphite and carbon nanotubes. *J. Phys. Chem. B*, 107:1345–1352.

Werder, T., Walther, J. H., Jaffe, R. L., Halicioglu, T., Noca, F., and Koumoutsakos, P. (2001). Molecular dynamics simulation of contact angle of water droplet in carbon nanotubes. *Nano Lett.*, 1:697–702.

Westermeier, R. (1990). *Electrophoresis in Practice*. VCH Publishers Inc, New York.

White, F. M. (1991). *Viscous Fluid Flow*. MacGraw-Hill International Editions, Mechanical Engineering Series.

Whitesides, G. M. and Grzybowski, B. (2002). Self-assembly at all scales. *Science*, 295:2418–2421.

Wiedmann, G. (1852). Ueber die bewegung von flussigkeiten im kreise der geschlossenen galvanischen saule. *Pogg. Ann.*, 87:321.

Wiggins, S. and Ottino, J. M. (2004). Foundations of chaotic mixing. *Phil. Trans. R. Soc. London, Ser. A*, 362:937–970.

Willemsen, S. M., Hoefsloot, H. C., and Iedema, P. D. (2000). No-slip boundary condition in dissipative particle dynamics. *Int. J. Mod. Phys.*, 11(5):881–890.

Williams, M. B. and Davis, S. H. (1982). Nonlinear theory of film rupture. *J. Colloid Interface Sci.*, 90:220–228.

Woelki, S. and Kohler, H. H. (2000). A modified Poisson-Boltzmann equation: I. basic relations. *Chem. Phys.*, 261:411–419.

Wolff, A., Larsen, U. D., Blankenstein, G., Philip, J., and Telleman, P. (1998). Rare event cell sorting in a microfluidic system for application in prenantal diagnosis. In *Micro Total Analysis Systems '98, Eds. Harrison and van den Berg, Kluwer*, pages 77–80.

Woodhouse, G., King, L., Wieczorek, L., Osman, P., and Cornell, B. (1999). The ion channel switch biosensor. *Journal of Molecular Recognition*, 12(5):328–334.

Woods, L. C. (1993). *An Introduction to The Kinetic Theory of Gases and Magnetoplasmas*. Oxford Science Publications.

Woodson, H. H. and Melcher, J. R. (1968). *Electromechanical Dynamics*. Wiley, New York.

Wu, J. and Carley, R. L. (2001). Table-based numerical macromodeling for MEMS devices. In *Modeling and Simulation of Microsystems*, pages 68–71.

Xiu, D. and Karniadakis, G. E. (2001). A semi-Lagrangian high-order method for Navier-Stokes equations. *J. Comp. Phys.*, 172:658.

Xu, K. (2003). Super-Burnett solutions for Poiseuille flow. *Phys. Fluids*, 15(7):2077–2080.

Xue, H. and Chen, S. (2003). DSMC simulation of microscale backward-facing step flow. *Microscale Thermophysical Engineering*, 7:69–86.

Xue, H., Ji, H. M., and Shu, C. (2003). Prediction of flow and heat transfer characteristics in micro-Couette flow. *Microscale Thermophys. Eng.*, 7(1):51–68.

Yager, P., Bell, D., Brody, J. P., Qin, D., Cabrera, C., Kamholz, A., and Weigl, B. (1998). Applying microfluidic chemical analytical systems to imperfect samples. In *Micro Total Analysis Systems '98, Eds. Harrison and van den Berg, Kluwer*, pages 207–212.

Yang, C. and Li, D. (1998). Analysis of electrokinetic effects on the liquid flow in rectangular microchannels. *J. Colloids Surfaces*, 143:339–353.

Yang, J., Huang, Y., Wang, X. B., Becker, F. F., and Gascoyne, P. R. (1999a). Cell separation on microfabricated electrodes using dielectrophoretic/gravitational field-flow fractionation. *Anal. Chem.*, 71:5:911–918.

Yang, J., Huang, Y., Wang, X. B., Becker, F. F., and Gascoyne, P. R. (2000). Differential analysis of human leukocytes by dielectrophoretic field-flow fractionation. *Biophys. J.*, 78:2680–2689.

Yang, J. M., Yang, X., Ho, C. M., and Tai, Y. C. (2001). Micromachined particle filter with low power dissipation. *J. Fluids Eng.*, 123:899–908.

Yang, X., Yang, J. M., Tai, Y. C., and Ho, C. M. (1999b). Micromachined membrane particle filters. *Sens. Actuators, A: Physical*, 73:184–191.

Ye, H., Naguib, N., Gogotsi, Y., Yazicioglu, A. G., and Megaridis, C. M. (2004). Wall structure and surface chemistry of hydrothermal carbon nanofibers. *Nanotechnology*, 15:232–236.

Ye, W., Kanapka, J., and White, J. (1999). A fast 3D solver for unsteady Stokes flow with applications to micro-electro-mechanical systems. In *Proceedings of the Second International Conference on Modeling and Simulation of Microsystems*, pages 518–521.

Yeh, I. and Berkowitz, M. L. (2000). Effects of the polarizability and water density constraints on the structure of water near charged surfaces: Molecular dynamics simulations. *J. Chem. Phys.*, 112:10491–10495.

Yong, W.-A. and Luo, L.-S. (2003). Nonexistence of H theorems for the athermal lattice Boltzmann models with polynomial equilibria. *Phys. Rev. E*, 67:051105.

Yu, S. and Ameel, T. A. (2002). Slip flow convection in isoflux rectangular microchannels. *Microscale Thermophysical Engineering*, 1:303–320.

Yuste, S. B. and Santos, A. (1994). A model for the structure of square-well fluids. *J. Chem. Phys.*, 101:2355–2364.

Zhang, L., Balasundaram, R., Jiang, S., and Gehrke, S. H. (2001). Nonequillibrium molecular dynamics simulation of confined liquids in contact with the bulk. *J. Chem. Phys.*, 114(15):6869–6877.

Zhang, Q., Zheng, J., Shevade, A., Zhang, L., Gehrke, S., Heffelfinger, G. S., and Jiang, S. (2002). Transport diffusion of liquid water and methanol through membranes. *J. Chem. Phys.*, 117:808–817.

Zhang, Y., Henson, M. A., and Kevrekidis, I. G. (2003). Non-linear reduction for dynamic analysis of cell population models. *Chemical Engineering Science*, 58:429–445.

Zhao, B., Moore, J. S., and Beebe, D. J. (2001). Surface-directed liquid flow inside microchannels. *Science*, 291:1023–1026.

Zheng, Y., Garcia, A. L., and Alder, B. J. (2002). Comparison of kinetic theory and hydrodynamics for Poiseuille flow. *J. Stat. Phys.*, 109:495–505.

Zheng, Z., Hansford, D. J., and Conlisk, A. T. (2003). Effect of multivalent ions on electroosmotic flow in micro- and nanochannels. *Electrophoresis*, 24.

Zholkovskij, E. K. and Masliyah, J. H. (2004). Hydrodynamic dispersion due to combined pressure driven and electroosmotic flow through micro-channels with a thin double layer. *Anal. Chem.*, 76:2708–2718.

Zholkovskij, E. K., Masliyah, J. H., and Czarnecki, J. (2003). Electroosmotic dispersion in microchannels with a thin double layer. *Anal. Chem.*, 75 (4):901–909.

Zhong, X. (1993). On numerical solutions of Burnett equations for hypersonic flow past 2-D circular blunt leading edges in continuum transition regime. In *AIAA 42. Fluid Dynamics Conference July 6-9, 1993, Orlando FL, AIAA 93-3092*.

Zhou, J. D., Cui, S. T., and Cochran, H. D. (2003). Molecular simulation of aqueous electrolytes in model silica nanochannels. *Mol. Phys.*, 101:1089–1094.

Zhou, N., Brown, S., and Pister, K. S. (1998). Nodal analysis of MEMS simulation and design. In *Modeling and Simulation of Microsystems*, pages 308–313.

Zhu, Y. and Granick, S. (2001). Rate-dependent slip of Newtonian liquid at smooth surfaces. *Phys. Rev. Lett.*, 87(9):096105.

Zhu, Y. and Granick, S. (2002). Limits of the hydrodynamic no-slip boundary condition. *Phys. Rev. Lett.*, 88(10):106102.