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### Education

Ph.D.	Physics	Cornell University	1982
M.S.	Physics	Cornell University	1979
B.S.	Physics and Mathematics	Wheaton College	1975

### Employment History

New York University	Chair, Dept. Chemical & Biomolecular Eng.	2014–present
	Silver Professor	2013–present
	Professor of Physics	2005–present
	Professor of Mathematics	2005–present
University of California, Santa Barbara	Chair, Dept. of Chemical Engineering	2001–2004
	Professor of Chemical Engineering	1995–2005
	Professor of Materials	1995–2005
Exxon Research & Engineering	Staff Physicist	1990–1995
Haverford College	Assistant Professor of Physics	1984–1989
University of Pittsburgh	Postdoctoral Research Associate	1982–1984

### Other Appointments or Honors

Member, BP Technology Advisory Council	2016–present
Fellow Professor of Chemical & Biomolecular Engineering Sungkyunkwan University, Suwon, South Korea	2012–present
Emilio Segre Distinguished Lectures of the Raymond & Beverly Sackler Foundation Professor Yuval Ne'eman Memorial Lecture, Tel-Aviv University, Israel	2016
Michelin Chair, ESPCI ParisTech, Paris, France	2015–2016
Founding Director of the Center for Soft Mater Research, New York University	2005–2014
Adjunct Professor of Chemical Engineering, KAIST Korean Advanced Institute for Science & Technology, Daejeon, South Korea	2001–2012
Chair and member of the Executive Committee of the Division of Condensed Matter Physics, American Physical Society	2007–2011
Co-Editor, The European Physical Journal E (Soft Matter)	2007–2010
Debye Lecturer, Utrecht University	2009
Bertman Lecturer, Wesleyan University	2008
Joliot Chair, ESPCI, Paris, France	2007–2008

École Supérieure de Physique et de Chimie Industrielles, Paris, France	
Langmuir Lecturer, American Chemical Society, New York	2003
Professeur Invité, ESPCI, Paris, France	2003
Rhodia Chair, Rhodia, Inc.	2001
Society of Rheology Publication of the Year Award	2000
Fellow of the American Association for the Advancement of Science	2000
Guggenheim Fellow	1999–2000
Professeur Invité, ESPCI, Paris, France	1999–2000
Fellow of the American Physical Society	1997
Professeur Invité, University of Strasbourg, France	1997
Consultant, Albemarle Corporation	1996
Visiting Directeur de Recherche, University of Strasbourg, France	1994
Visiting Scientist, Exxon Research & Engineering	1987–1988

## Publications

- [1] **Diffusion and electrotransport of hydrogen and deuterium in vanadium-titanium and vanadium-chromium alloys.** D. J. Pine and R. M. Cotts. *Phys. Rev. B* **28**, 641–647 (1983).
- [2] **Active-coupling mixing times for a stirred binary liquid.** N. Easwar, J. V. Maher, D. J. Pine, and W. I. Goldberg. *Phys. Rev. Lett.* **51**, 1272–1274 (1983).
- [3] **Turbulent suppression of spinodal decomposition.** D. J. Pine, N. Easwar, J. V. Maher, and W. I. Goldberg. *Phys. Rev. A* **29**, 308–313 (1984).
- [4] **Accurate measurement of hydrogen diffusivity in metals.** D. J. Pine and R. M. Cotts. *Rev. Sci. Instr.* **55**, 614–616 (1984).
- [5] **Azimuthal integration of scattered light intensity using a conical lens.** D. J. Pine. *Rev. Sci. Instr.* **55**, 856–859 (1984).
- [6] **Diffusing-wave spectroscopy.** D. J. Pine, D. A. Weitz, P. M. Chaikin, and E. Herbolzheimer. *Phys. Rev. Lett.* **60**, 1134–1137 (1988).
- [7] **Features of diffusing-wave spectroscopy.** D. J. Pine, D. A. Weitz, P. M. Chaikin, and E. Herbolzheimer. In J. Abbiss and A. E. Smart, editors, *OSA Proceedings on Photon Correlation Techniques and Applications*, volume 1, pp. 35–43. Optical Society of America, Washington, DC (1988).
- [8] **Self-diffusion of interacting colloids far from equilibrium.** X. Qiu, H. D. Ou-Yang, D. J. Pine, and P. M. Chaikin. *Phys. Rev. Lett.* **61**, 2554–2557 (1988).
- [9] **Nondiffusive Brownian motion studied by diffusing-wave spectroscopy.** D. A. Weitz, D. J. Pine, P. N. Pusey, and R. J. A. Tough. *Phys. Rev. Lett.* **63**, 1747–1750 (1989).
- [10] **Polarization memory of multiply scattered light.** F. C. MacKintosh, J. X. Zhu, D. J. Pine, and D. A. Weitz. *Phys. Rev. B* **40**, 9342–9345 (1989).
- [11] **Temporal correlations of multiply scattered light.** D. A. Weitz, D. J. Pine, P. N. Pusey, E. Herbolzheimer, and P. M. Chaikin. In A. Gonzalez, C. Varea, and M. Medina-Noyola, editors, *XVIII Winter Meeting on Statistical Physics: Lectures on Thermodynamics and Statistical Mechanics*, pp. 139–149. World Scientific, Singapore (1989).
- [12] **Diffusing-wave spectroscopy in a shear flow.** X.-l. Wu, D. J. Pine, P. M. Chaikin, J. S. Huang, and D. A. Weitz. *J. Opt. Soc. Am. B* **7**, 15–20 (1990).
- [13] **Nondiffusive Brownian motion studied by diffusing-wave spectroscopy.** D. J. Pine, D. A. Weitz, D. J. Durian, P. N. Pusey, and R. J. A. Tough. In C. Safinya, S. Safran, and P. Pincus, editors, *Macromolecular Fluids*, volume 177 of *Mat. Res. Soc. Symp. Proc.*, pp. 225–230. Materials Research Society, Pittsburgh (1990).
- [14] **Dynamics of concentrated colloidal suspensions.** D. A. Weitz, L. Ye, P. Sheng, J. S. Huang, D. J. Pine, J. Liu, P. M. Chaikin, and P. N. Pusey. In C. Safinya, S. Safran, and P. Pincus, editors, *Macromolecular Fluids*, volume 177 of *Mat. Res. Soc. Symp. Proc.*, pp. 207–212. Materials Research Society, Pittsburgh (1990).
- [15] **Dynamical correlations of multiply scattered light.** D. J. Pine, D. A. Weitz, G. Maret, P. E. Wolf, E. Herbolzheimer, and P. M. Chaikin. In P. Sheng, editor, *Scattering and localization of classical waves in random media*, volume 8 of *World scientific series on directions in condensed matter physic*, pp. 312–372. World Scientific, Singapore (1990).
- [16] **Pulsed diffusing-wave spectroscopy: Pathlength specific observation of speckle fluctuation spectra from dense colloids.** A. G. Yodh, P. D. Kaplan, and D. J. Pine. In C. B. Harris, E. Ippen, G. Mourou, and A. Zewail, editors, *Ultrafast Phenomena VII: Proceedings of the 7th International Conference*, volume 53 of *Springer Series in Chemical Physics*, pp. 169–171. Springer-Verlag, Berlin (1990).

- [17] **Hydrodynamic interactions in concentrated suspensions.** X. Qiu, X.-l. Wu, J. Z. Xue, D. J. Pine, D. A. Weitz, and P. M. Chaikin. *Phys. Rev. Lett.* **65**, 516–519 (1990).
- [18] **Pulsed diffusing-wave spectroscopy: High resolution through nonlinear optical gating.** A. G. Yodh, P. Kaplan, and D. J. Pine. *Phys. Rev. B* **42**, 4744–4747 (1990).
- [19] **Diffusing-wave spectroscopy: Dynamic light scattering in the multiple scattering limit.** D. J. Pine, D. A. Weitz, J. Zhu, and E. Herbolzheimer. *Journal de Physique* **51**, 2101–2127 (1990).
- [20] **Dynamics and coarsening in 3-dimensional foams.** D. J. Durian, D. A. Weitz, and D. J. Pine. *J. Phys.-Cond. Mat.* **2**, Sa433–Sa436 (1990).
- [21] **Multiple light-scattering probes of foam structure and dynamics.** D. J. Durian, D. A. Weitz, and D. J. Pine. *Science* **252**, 686–688 (1991).
- [22] **Enhanced concentration fluctuations in polymer solutions under shear flow.** X.-l. Wu, D. J. Pine, and P. K. Dixon. *Phys. Rev. Lett.* **66**, 2408–2411 (1991).
- [23] **Diffusing-wave interferometry.** A. G. Yodh, N. Georgiades, and D. J. Pine. *Opt. Comm.* **83**, 56–59 (1991).
- [24] **Internal reflection of diffusive light in random media.** J. Zhu, D. J. Pine, and D. A. Weitz. *Phys. Rev. A* **44**, 3948–3959 (1991).
- [25] **Scaling behavior in shaving cream.** D. J. Durian, D. A. Weitz, and D. J. Pine. *Phys. Rev. A* **44**, R7902–R7905 (1991).
- [26] **The structure and dynamics of a semidilute polymer solution under shear flow.** P. K. Dixon, D. J. Pine, and X.-l. Wu. *Polym. Mater. Sci. Eng.* **65**, 218–225 (1991).
- [27] **Pulsed diffusing-wave spectroscopy in dense colloids.** A. G. Yodh, P. Kaplan, and D. J. Pine. In A. A. Maradudin, K. K. Rebane, and E. Garmire, editors, *Laser optics of condensed matter*, volume 2, pp. 307–311. Plenum, New York (1991).
- [28] **Hydrodynamic interactions in hard-sphere suspensions.** J.-Z. Xue, X.-L. Wu, D. J. Pine, and P. M. Chaikin. *Phys. Rev. A* **45**, 989–993 (1992).
- [29] **Diffusion and structure in dense binary suspensions.** P. D. Kaplan, A. G. Yodh, and D. J. Pine. *Phys. Rev. Lett.* **68**, 393–396 (1992).
- [30] **Principles and applications of diffusing-wave spectroscopy.** D. A. Weitz, J. Zhu, D. J. Durian, and D. J. Pine. In S. Chen, J. Huang, and P. Tartaglia, editors, *Structure and dynamics of strongly interacting colloids and supramolecular aggregates in solution*, Structure and Dynamics of Supramolecular Aggregates and Strongly Interacting Colloids. Kluwer, Dordrecht (1992).
- [31] **Speckle fluctuations and their use as probes of dense random media.** A. G. Yodh, D. J. Pine, P. Kaplan, W. Kao, and N. Georgiades. *Molecular Crystal Liquid Crystal Science and Technology – Section B: Nonlinear Optics* **3**, 149–160 (1992).
- [32] **Reply to ‘Comment of “Polarization memory of multiply scattered light” ’.** F. MacKintosh, J. Zhu, D. J. Pine, and D. A. Weitz. *Phys. Rev. B* **45**, 8165 (1992).
- [33] **Mode selection in the dynamics of sheared polymer solutions.** P. K. Dixon, D. J. Pine, and X.-I. Wu. *Phys. Rev. Lett.* **68**, 2239–2242 (1992).
- [34] **Scaling of transient hydrodynamic interactions in concentrated suspensions.** J. Zhu, D. J. Durian, J. Muller, D. A. Weitz, and D. J. Pine. *Phys. Rev. Lett.* **68**, 2559–2562 (1992).
- [35] **Nonergodicity and light scattering from polymer gels.** J. Xue, D. J. Pine, S. Milner, X.-l. Wu, and P. M. Chaikin. *Phys. Rev. A* **46**, 6550–6563 (1992).

- [36] **Shear-enhanced structure and dynamics in semidilute polymer solutions.** P. K. Dixon, D. J. Pine, and X.-I. Wu. In D. A. Weitz, E. Sirota, T. A. Witten, and J. Israelachvili, editors, *Complex Fluids*, volume 248 of *Mat. Res. Soc. Symp. Proc.*, pp. 127–138. Materials Research Society, Pittsburgh (1992).
- [37] **Kinetics of shear induced micellar association.** L. Dewalt, H. Ou-Yang, M. Kim, S.-N. Liu, D. J. Pine, P. K. Dixon, and D. Peiffer. In D. A. Weitz, E. Sirota, T. Witten, and J. Israelachvili, editors, *Complex Fluids*, volume 248 of *Mat. Res. Soc. Symp. Proc.*, pp. 203–208. Materials Research Society, Pittsburgh, PA (1992).
- [38] **Scaling in three-dimensional foams.** D. J. Durian, D. A. Weitz, and D. J. Pine. In D. A. Weitz, E. Sirota, T. A. Witten, and J. Israelachvili, editors, *Complex Fluids*, volume 248 of *Mat. Res. Soc. Symp. Proc.*, pp. 295–299. Materials Research Society, Pittsburgh, PA (1992).
- [39] **Observation of Brownian motion on the time scale of hydrodynamic interactions.** M. H. Kao, A. G. Yodh, and D. J. Pine. *Phys. Rev. Lett.* **70**, 242–245 (1993).
- [40] **Diffusing-wave spectroscopy.** D. A. Weitz and D. J. Pine. In W. Brown, editor, *Dynamic Light Scattering: The Method and Some Applications*, volume 49 of *Monographs on the physics and chemistry of material*, pp. 652–720. Oxford University Press, Oxford (1993).
- [41] **Diffusing-wave spectroscopy: The technique and some applications.** D. A. Weitz, J. Zhu, D. J. Durian, H. Gang, and D. J. Pine. *Physica Scripta* **T49b**, 610–621 (1993).
- [42] **Geometric constraints for the design of diffusing-wave spectroscopy experiments.** P. D. Kaplan, M. H. Kao, A. G. Yodh, and D. J. Pine. *Applied Optics* **32**, 3828–3836 (1993).
- [43] **Entropically driven surface phase separation in binary colloidal mixtures.** P. D. Kaplan, J. L. Rouke, A. G. Yodh, and D. J. Pine. *Phys. Rev. Lett.* **72**, 582–585 (1994).
- [44] **Diffusing-wave spectroscopy and interferometry.** D. J. Pine, D. A. Weitz, J. Zhu, D. J. Durian, A. Yodh, and M. Kao. *Macromolecular Symposia* **79**, 31–44 (1994).
- [45] **Multiple scattering probes of disordered materials.** D. A. Weitz and D. J. Pine. *MRS Bulletin* **19**, 39–44 (1994).
- [46] **The effect of intrinsic rigidity on the optical properties of PPV derivatives.** C. L. Gettinger, A. J. Heeger, J. M. Drake, and D. J. Pine. *Molecular Crystals and Liquid Crystals* **256**, 507–512 (1994).
- [47] **A photoluminescence study of poly(phenylene vinylene) derivatives: The effect of intrinsic persistence length.** C. L. Gettinger, A. J. Heeger, J. M. Drake, and D. J. Pine. *J. Chem. Phys.* **101**, 1673–1678 (1994).
- [48] **Diffuse transmission spectroscopy: A structural probe of opaque colloidal mixtures.** P. D. Kaplan, A. D. Dinsmore, A. G. Yodh, and D. J. Pine. *Phys. Rev. E* **50**, 4827–4835 (1994).
- [49] **Solution characterization of surfactant solubilized polyaniline.** C. L. Gettinger, A. J. Heeger, D. J. Pine, and Y. Cao. *Synthetic Metals* **74**, 81–88 (1995).
- [50] **Phase diagrams of nearly hard-sphere binary colloids.** A. D. Dinsmore, A. G. Yodh, and D. J. Pine. *Phys. Rev. E* **52**, 4045–4057 (1995).
- [51] **Structure evolution of a polymer solution at high shear rates.** K. Migler, C. Liu, and D. J. Pine. *Macromolecules* **29**, 1422–1432 (1996).
- [52] **Shear-induced gelation and fracture in micellar solutions.** C.-h. Liu and D. J. Pine. *Phys. Rev. Lett.* **77**, 2121–2124 (1996).
- [53] **Entropic control of particle motion using passive surface microstructures.** A. D. Dinsmore, A. G. Yodh, and D. J. Pine. *Nature* **383**, 239–242 (1996).

- [54] **Inhomogeneous structure formation and shear-thickening in worm-like micellar solutions.** P. Boltenhagen, Y. Hu, E. Matthys, and D. J. Pine. *Europhysics Letters* **38**, 389–394 (1997).
- [55] **Yielding and rearrangements in disordered emulsions.** P. Hebraud, F. Lequeux, J. Munch, and D. J. Pine. *Phys. Rev. Lett.* **78**, 4657–4660 (1997).
- [56] **Stability of nonaqueous emulsions.** A. Imhof and D. J. Pine. *J. Coll. Int. Sci.* **192**, 368–374 (1997).
- [57] **Observation of bulk phase separation and coexistence in a sheared micellar solution.** P. Boltenhagen, Y. Hu, E. Matthys, and D. J. Pine. *Phys. Rev. Lett.* **79**, 2359–2362 (1997).
- [58] **Ordered macroporous materials by emulsion templating.** A. Imhof and D. J. Pine. *Nature* **389**, 948–951 (1997).
- [59] **Imaging of intermittency in ripple-wave turbulence.** W. B. Wright, R. Budakian, D. J. Pine, and S. J. Putterman. *Science* **278**, 1609–1612 (1997).
- [60] **Direct observation of shear-induced structures in wormlike micellar solutions by freeze-fracture electron microscopy.** S. L. Keller, P. Boltenhagen, D. J. Pine, and J. Zasadzinski. *Phys. Rev. Lett.* **80**, 2725–2728 (1998).
- [61] **Uniform macroporous ceramics and plastics by emulsion templating.** A. Imhof and D. J. Pine. *Adv. Mat.* **10**, 697–700 (1998).
- [62] **Shear-thickening in low-concentration solutions of worm-like micelles I: Direct visualization of transient behavior and phase transitions.** Y. Hu, P. Boltenhagen, and D. J. Pine. *J. Rheol.* **42**, 1185–1208 (1998).
- [63] **Shear-thickening in low-concentration solutions of worm-like micelles II: Slip, fracture, and stability of the shear-induced phase.** Y. Hu, P. Boltenhagen, E. Matthys, and D. J. Pine. *J. Rheol.* **42**, 1209–1226 (1998).
- [64] **Macroporous materials with uniform pores by emulsion templating.** A. Imhof and D. J. Pine. In N. Rodriguez, S. Soled, and J. Hrbek, editors, *Recent Advances in Catalytic Materials*, volume 497 of *Mat. Res. Soc. Symp. Proc.*, pp. 167–172. Materials Research Society, Warrendale, Pennsylvania (1998).
- [65] **Hierarchically ordered oxides.** P. Yang, T. Deng, D. Zhao, P. Feng, D. J. Pine, B. Chmelka, G. Whitesides, and G. Stucky. *Science* **282**, 2244–2246 (1998).
- [66] **Preparation of titania foams.** A. Imhof and D. J. Pine. *Adv. Mat.* **11**, 311–314 (1999).
- [67] **Ordered macroporous materials by colloidal assembly: A possible route to photonic bandgap materials.** G. Subramanian, V. N. Manoharan, J. D. Thorne, and D. J. Pine. *Adv. Mat.* **11**, 1261–1265 (1999).
- [68] **A phenomenological model for shear-thickening in wormlike micelle solutions.** J. L. Goveas and D. J. Pine. *Europhysics Letters* **48**, 706–712 (1999).
- [69] **Monolithic mesoporous silica templated by microemulsion liquid crystals.** P. Y. Feng, X. H. Bu, G. D. Stucky, and D. J. Pine. *J. Am. Chem. Soc.* **122**, 994–995 (2000).
- [70] **Drop deformation, breakup, and coalescence with compatibilizer.** Y. T. Hu, D. J. Pine, and L. G. Leal. *Physics of Fluids* **12**, 484–489 (2000).
- [71] **Ordered macroporous rutile titanium dioxide by emulsion templating.** V. N. Manoharan, A. Imhof, J. D. Thorne, and D. J. Pine. In J. W. Perry and A. Scherer, editors, *Micro- and Nano-photonic Materials and Devices*, volume 3937 of *Proceedings of SPIE*, p. 182. SPIE, San Jose, California (2000).
- [72] **Time-resolved small-angle neutron scattering study of shear-thickening surfactant solutions after the cessation of flow.** R. Oda, V. Weber, P. Lindner, D. J. Pine, E. Mendes, and F. Schosseler. *Langmuir* **16**, 4859–4863 (2000).

- [73] **Light scattering and rheology of complex fluids driven far from equilibrium.** D. J. Pine. In M. Cates and M. Evans, editors, *Soft and Fragile Matter*, volume 53 of *SUSSP Proceedings*, pp. 9–47. SUSSP Institute of Physics, Bristol (2000).
- [74] **Control of pore sizes in mesoporous silica templated by liquid crystals in block copolymer-cosurfactant-water systems.** P. Y. Feng, X. H. Bu, and D. J. Pine. *Langmuir* **16**, 5304–5310 (2000).
- [75] **Macroscopic shear alignment of bulk transparent mesostructured silica.** N. A. Melosh, P. Davidson, P. Feng, D. J. Pine, and B. F. Chmelka. *J. Am. Chem. Soc.* **123**, 1240–1241 (2001).
- [76] **Photonic crystals from emulsion templates.** V. N. Manoharan, A. Imhof, J. D. Thorne, and D. J. Pine. *Adv. Mat.* **13**, 447–450 (2001).
- [77] **Self-assembling quantum dot lattices through nucleation site engineering.** B. D. Gerardot, G. Subramanian, S. Minvielle, H. Lee, J. A. Johnson, W. V. Schoenfeld, D. Pine, J. S. Speck, and P. M. Petroff. *Journal of Crystal Growth* **236**, 647–654 (2002).
- [78] **Rapidly recovering hydrogel scaffolds from self-assembling diblock copolypeptide amphiphiles.** A. P. Nowak, V. Breedveld, L. Pakstis, B. Ozbas, D. J. Pine, D. Pochan, and T. J. Deming. *Nature* **417**, 424–428 (2002).
- [79] **Multispeckle diffusing-wave spectroscopy: A tool to study slow relaxation and time-dependent dynamics.** V. Viasnoff, F. Lequeux, and D. J. Pine. *Rev. Sci. Inst.* **73**, 2336–2344 (2002).
- [80] **Monodisperse micrometer-scale spherical assemblies of polymer particles.** G. R. Yi, V. N. Manoharan, S. Klein, K. R. Brzezinska, D. J. Pine, F. F. Lange, and S. M. Yang. *Adv. Mat.* **14**, 1137–1140 (2002).
- [81] **Packings of uniform microspheres with ordered macropores fabricated by double templating.** G. R. Yi, J. H. Moon, V. N. Manoharan, D. J. Pine, and S. M. Yang. *J. Am. Chem. Soc.* **124**, 13354–13355 (2002).
- [82] **Phase separation in a polymer solution induced by steady and large amplitude oscillatory shear flow.** S. Saito, T. Hashimoto, I. Morfin, P. Lindner, F. Boue, and D. J. Pine. *Macromolecules* **36**, 3745–3748 (2003).
- [83] **Synthesis of rutile titania powders: Agglomeration, dissolution, and reprecipitation phenomena.** S. M. Klein, J. H. Choi, D. J. Pine, and F. F. Lange. *Journal of Materials Research* **18**, 1457–1464 (2003).
- [84] **Dense packing and symmetry in small clusters of microspheres.** V. N. Manoharan, M. T. Elsesser, and D. J. Pine. *Science* **301**, 483–487 (2003).
- [85] **Generation of uniform colloidal assemblies in soft microfluidic devices.** G. R. Yi, T. Thorsen, V. N. Manoharan, M. J. Hwang, S. J. Jeon, D. J. Pine, S. R. Quake, and S. M. Yang. *Adv. Mat.* **15**, 1300–1304 (2003).
- [86] **Generation of uniform photonic balls by template-assisted colloidal crystallization.** G. R. Yi, S. J. Jeon, T. Thorsen, V. N. Manoharan, S. R. Quake, D. J. Pine, and S. M. Yang. *Synthetic Metals* **139**, 803–806 (2003).
- [87] **Microrheology as a tool for high-throughput screening.** V. Breedveld and D. J. Pine. *Journal of Materials Science* **38**, 4461–4470 (2003).
- [88] **Preparation of monodisperse PMMA microspheres in nonpolar solvents by dispersion polymerization with a macromonomeric stabilizer.** S. M. Klein, V. N. Manoharan, D. J. Pine, and F. F. Lange. *Colloid and Polymer Science* **282**, 7–13 (2003).
- [89] **Unusual salt stability in highly charged diblock co-polypeptide hydrogels.** A. P. Nowak, V. Breedveld, D. J. Pine, and T. J. Deming. *J. Am. Chem. Soc.* **125**, 15666–15670 (2003).
- [90] **Friedel-crafts alkylation properties of aluminosilica SBA-15 meso/macroporous monolith and mesoporous powders.** J. J. Chiu, D. J. Pine, S. T. Bishop, and B. F. Chmelka. *J. Catal.* **221**, 400–412 (2004).
- [91] **Building materials by packing spheres.** V. N. Manoharan and D. J. Pine. *MRS Bulletin* **29**, 91–95 (2004).

- [92] **Electrospray-assisted fabrication of uniform photonic balls.** J. H. Moon, G. R. Yi, S. M. Yang, D. J. Pine, and S. Bin Park. *Adv. Mat.* **16**, 605–609 (2004).
- [93] **Rheology of block copolypeptide solutions: Hydrogels with tunable properties.** V. Breedveld, A. P. Nowak, J. Sato, T. J. Deming, and D. J. Pine. *Macromolecules* **37**, 3943–3953 (2004).
- [94] **Colloidal clusters of silica or polymer microspheres.** G.-R. Yi, V. N. Manoharan, E. Michel, M. T. Elsesser, S.-M. Yang, and D. J. Pine. *Adv. Mat.* **16**, 1204–1208 (2004).
- [95] **Multiple-exposure holographic lithography with phase shift.** J. H. Moon, S. M. Yang, D. J. Pine, and W. S. Chang. *Applied Physics Letters* **85**, 4184–4186 (2004).
- [96] **Patterned polymer photonic crystals using soft lithography and holographic lithography.** J. H. Moon, A. Small, G. R. Yi, S. K. Lee, W. S. Chang, D. J. Pine, and S. M. Yang. *Synthetic Metals* **148**, 99–102 (2005).
- [97] **Control of nanoparticle location in block copolymers.** J. Chiu, B. Kim, E. Kramer, and D. J. Pine. *J. Am. Chem. Soc.* **127**, 5036–5037 (2005).
- [98] **Selective, controllable, and reversible aggregation of polystyrene latex microspheres via DNA hybridization.** P. H. Rogers, E. Michel, C. A. Bauer, S. Vanderet, D. Hansen, B. K. Roberts, A. Calvez, J. B. Crews, K. O. Lau, A. Wood, D. J. Pine, and P. V. Schwartz. *Langmuir* **21**, 5562–5569 (2005).
- [99] **Synthesis of spherical polymer and titania photonic crystallites.** S. M. Klein, V. N. Manoharan, D. J. Pine, and F. F. Lange. *Langmuir* **21**, 6669–6674 (2005).
- [100] **Colloidal clusters of microspheres from water-in-oil emulsions.** Y. S. Cho, G. R. Yi, S. H. Kim, D. J. Pine, and S. M. Yang. *Chemistry of Materials* **17**, 5006–5013 (2005).
- [101] **Nanoparticle-induced phase transitions in diblock-copolymer films.** B. J. Kim, J. J. Chiu, G. R. Yi, D. J. Pine, and E. J. Kramer. *Adv. Mat.* **17**, 2618–2622 (2005).
- [102] **Self-organization of bidisperse colloids in water droplets.** Y. S. Cho, G. R. Yi, J. M. Lim, S. H. Kim, V. N. Manoharan, D. J. Pine, and S. M. Yang. *J. Am. Chem. Soc.* **127**, 15968–15975 (2005).
- [103] **Translation of interference pattern by phase shift for diamond photonic crystals.** J. H. Moon, S. Yang, D. J. Pine, and S. M. Yang. *Optics Express* **13**, 9841–9846 (2005).
- [104] **Chaos and threshold for irreversibility in sheared suspensions.** D. J. Pine, J. P. Gollub, J. F. Brady, and A. M. Leshansky. *Nature* **438**, 997–1000 (2005).
- [105] **Scattering properties of core-shell particles in plastic matrices.** A. Small, S. Hong, and D. J. Pine. *J. Polym. Sci. B-Polymer Physics* **43**, 3534–3548 (2005).
- [106] **Preparation of doublet, triangular, and tetrahedral colloidal clusters by controlled emulsification.** D. Zerrouki, B. Rotenberg, S. Abramson, J. Baudry, C. Goubault, F. Leal-Calderon, D. J. Pine, and J. Bibette. *Langmuir* **22**, 57–62 (2006).
- [107] **Microscopic irreversibility and chaos.** J. P. Gollub and D. J. Pine. *Physics Today* **59**, 8–9 (2006).
- [108] **Formation of anisotropic polymer colloids by disparate relaxation times.** W. K. Kegel, D. Breed, M. Elsesser, and D. J. Pine. *Langmuir* **22**, 7135–7136 (2006).
- [109] **Pixellated photonic crystal films by selective photopolymerization.** S. K. Lee, G. R. Yi, J. H. Moon, S. M. Yang, and D. J. Pine. *Adv. Mat.* **18**, 2111–2116 (2006).
- [110] **Microwave-assisted self-organization of colloidal particles in confining aqueous droplets.** S. H. Kim, S. Y. Lee, G. R. Yi, D. J. Pine, and S. M. Yang. *J. Am. Chem. Soc.* **128**, 10897–10904 (2006).
- [111] **Delocalization of classical waves in highly anisotropic random media.** A. Small and D. J. Pine. *Phys. Rev. E* **75**, 016617 (2007).

- [112] **Distribution of nanoparticles in lamellar domains of block copolymers.** J. J. Chiu, B. J. Kim, G. R. Yi, J. Bang, E. J. Kramer, and D. J. Pine. *Macromolecules* **40**, 3361–3365 (2007).
- [113] **Particles with coordinated patches or windows from oil-in-water emulsions.** Y. S. Cho, G. R. Yi, S. H. Kim, S. J. Jeon, M. T. Elsesser, H. K. Yu, S. M. Yang, and D. J. Pine. *Chemistry of Materials* **19**, 3183–3193 (2007).
- [114] **Stirring stuff.** D. J. Pine. *Nature* **448**, 876–877 (2007).
- [115] **Creating surfactant nanoparticles for block copolymer composites through surface chemistry.** B. J. Kim, J. Bang, C. J. Hawker, J. J. Chiu, D. J. Pine, S. G. Jang, S. M. Yang, and E. J. Kramer. *Langmuir* **23**, 12693–12703 (2007).
- [116] **Surfactant-assisted synthesis of uniform titania microspheres and their clusters.** H. K. Yu, G. R. Yi, J. H. Kang, Y. S. Cho, V. N. Manoharan, D. J. Pine, and S. M. Yang. *Chemistry of Materials* **20**, 2704–2710 (2008).
- [117] **Random organization in periodically driven systems.** L. Corté, P. M. Chaikin, J. P. Gollub, and D. J. Pine. *Nature Physics* **4**, 420–424 (2008).
- [118] **Chiral colloidal clusters.** D. Zerrouki, J. Baudry, D. Pine, P. Chaikin, and J. Bibette. *Nature* **455**, 380–382 (2008).
- [119] **Simple quantitative model for the reversible association of DNA coated colloids.** R. Dreyfus, M. E. Leunissen, R. Sha, A. V. Tkachenko, N. C. Seeman, D. J. Pine, and P. M. Chaikin. *Phys. Rev. Lett.* **102**, 048301–1–4 (2009).
- [120] **Functionalization of polymer microspheres using click chemistry.** D. R. Breed, R. Thibault, F. Xie, Q. Wang, C. J. Hawker, and D. J. Pine. *Langmuir* **25**, 4370–4376 (2009).
- [121] **Towards self-replicating materials of DNA-functionalized colloids.** M. E. Leunissen, R. Dreyfus, R. Sha, T. Wang, N. C. Seeman, D. J. Pine, and P. M. Chaikin. *Soft Matter* **5**, 2422–2430 (2009).
- [122] **Hierarchically structured colloids of diblock copolymers and au nanoparticles.** S. J. Jeon, S. M. Yang, B. J. Kim, J. D. Petrie, S. G. Jang, E. J. Kramer, D. J. Pine, and G. R. Yi. *Chemistry of Materials* **21**, 3739–3741 (2009).
- [123] **Self-organized criticality in sheared suspensions.** L. Corté, S. J. Gerbode, W. Man, and D. J. Pine. *Phys. Rev. Lett.* **103**, 248301 (2009).
- [124] **Lock and key colloids.** S. Sacanna, W. T. M. Irvine, P. M. Chaikin, and D. J. Pine. *Nature* **464**, 575–578 (2010).
- [125] **Aggregation-disaggregation transition of DNA-coated colloids: Experiments and theory.** R. Dreyfus, M. E. Leunissen, R. Sha, A. Tkachenko, N. C. Seeman, D. J. Pine, and P. M. Chaikin. *Phys. Rev. E* **81**, 041404–1–10 (2010).
- [126] **Large core-shell poly(methyl methacrylate) colloidal clusters: synthesis, characterization, and tracking.** M. T. Elsesser, A. D. Hollingsworth, K. V. Edmond, and D. J. Pine. *Langmuir* **27**, 917–927 (2011).
- [127] **Lock and key colloids through polymerization-induced buckling of monodisperse silicon oil droplets.** S. Sacanna, W. T. M. Irvine, L. Rossi, and D. J. Pine. *Soft Matter* **7**, 1631–1634 (2011).
- [128] **Shape-anisotropic colloids: Building blocks for complex assemblies.** S. Sacanna and D. J. Pine. *Current Opinion in Colloid & Interface Science* **16**, 96–105 (2011).
- [129] **Cubic crystals from cubic colloids.** L. Rossi, S. Sacanna, W. T. M. Irvine, P. M. Chaikin, D. J. Pine, and A. P. Philipse. *Soft Matter* **7**, 4139–4142 (2011).

- [130] **Self-replication of information-bearing nanoscale patterns.** T. Wang, R. Sha, R. Dreyfus, M. E. Leunissen, C. Maass, D. J. Pine, P. M. Chaikin, and N. C. Seeman. *Nature* **478**, 225–228 (2011).
- [131] **Transverse alignment of fibers in a periodically sheared suspension: An absorbing phase transition with a slowly-varying control parameter.** A. Franceschini, E. Filippidi, E. Guazzelli, and D. J. Pine. *Phys. Rev. Lett.* **107**, 250603 (2011).
- [132] **Magnetic click colloidal assembly.** S. Sacanna, L. Rossi, and D. J. Pine. *J. Am. Chem. Soc.* **134**, 6112–6115 (2012).
- [133] **Synthesis and assembly of colloidal particles with sticky dimples.** S.-H. Kim, A. D. Hollingsworth, S. Sacanna, S.-J. Chang, G. Lee, D. J. Pine, and G.-R. Yi. *J. Am. Chem. Soc.* **134**, 16115–16118 (2012).
- [134] **Decoupling of rotational and translational diffusion in supercooled colloidal fluids.** K. V. Edmond, M. T. Elsesser, G. L. Hunter, D. J. Pine, and E. R. Weeks. *Proc. Nat. Acad. Sci.* **109**, 17891–17896 (2012).
- [135] **Colloids with valence and specific directional bonding.** Y. Wang, Y. Wang, D. R. Breed, V. N. Manoharan, L. Feng, A. D. Hollingsworth, M. Weck, and D. J. Pine. *Nature* **491**, 51–55 (2012).
- [136] **Living crystals of light-activated colloidal surfers.** J. Palacci, S. Sacanna, A. S. Steinberg, D. J. Pine, and P. M. Chaikin. *Science* **339**, 936–940 (2013).
- [137] **Shaping colloids for self-assembly.** S. Sacanna, M. Korpics, K. Rodriguez, L. Colón-Meléndez, S.-H. Kim, D. J. Pine, and G.-R. Yi. *Nature Communications* **4**, 1688 (2013).
- [138] **Recent progress on patchy colloids and their self-assembly.** G.-R. Yi, D. J. Pine, and S. Sacanna. *J. Phys.-Cond. Mat.* **25**, 193101 (2013).
- [139] **Engineering shape: the novel geometries of colloidal self-assembly.** S. Sacanna, D. J. Pine, and G.-R. Yi. *Soft Matter* **9**, 8096–8106 (2013).
- [140] **Patchy Particle Self-Assembly via Metal Coordination.** Y. Wang, A. D. Hollingsworth, S. K. Yang, S. Patel, D. J. Pine, and M. Weck. *J. Am. Chem. Soc.* **135**, 14064–14067 (2013).
- [141] **Photoactivated Colloidal Dockers for Cargo Transportation.** J. Palacci, S. Sacanna, A. Vatchinsky, P. M. Chaikin, and D. J. Pine. *J. Am. Chem. Soc.* **135**, 15978–15981 (2013).
- [142] **Brownian motion and the hydrodynamic friction tensor for colloidal particles of complex shape.** D. J. Kraft, R. Wittkowski, B. ten Hagen, K. V. Edmond, D. J. Pine, and H. Löwen. *Phys. Rev. E* **88**, 050301 (2013).
- [143] **Two-Minute Assembly of Pristine Large-Area Graphene Based Films.** J. Shim, J. M. Yun, T. Yun, P. Kim, K. E. Lee, W. J. Lee, R. Ryoo, D. J. Pine, G.-R. Yi, and S. O. Kim. *Nano Letters* **14**, 1388–1393 (2014).
- [144] **Three-dimensional lock and key colloids.** Y. Wang, Y. Wang, X. Zheng, G.-R. Yi, S. Sacanna, D. J. Pine, and M. Weck. *J. Am. Chem. Soc.* **136**, 6866–6869 (2014).
- [145] **Dynamics of non-Brownian fiber suspensions under periodic shear.** A. Franceschini, E. Filippidi, E. Guazzelli, and D. J. Pine. *Soft Matter* **10**, 6722–6731 (2014).
- [146] **A microscopic view of the yielding transition in concentrated emulsions.** E. D. Knowlton, D. J. Pine, and L. Cipelletti. *Soft Matter* **10**, 6931–6940 (2014).
- [147] **Digital colloids: reconfigurable clusters as high information density elements.** C. L. Phillips, E. Jankowski, B. J. Krishnatreya, K. V. Edmond, S. Sacanna, D. G. Grier, D. J. Pine, and S. C. Glotzer. *Soft Matter* **10**, 7468–7479 (2014).
- [148] **Light-activated self-propelled colloids.** J. Palacci, S. Sacanna, S.-H. Kim, G.-R. Yi, D. J. Pine, and P. M. Chaikin. *Phil. Trans. R. Soc. A* **372**, 20130372 (2014).

- [149] **Patchy particle packing under electric fields.** P. Song, Y. Wang, Y. Wang, A. D. Hollingsworth, M. Weck, D. J. Pine, and M. D. Ward. *J. Am. Chem. Soc.* **137**, 3069–3075 (2015).
- [150] **Shape-sensitive crystallization in colloidal superball fluids.** L. Rossi, V. Soni, D. J. Ashton, D. J. Pine, A. P. Philipse, P. M. Chaikin, M. Dijkstra, S. Sacanna, and W. T. M. Irvine. *Proc. Nat. Acad. Sci. (USA)* **112**, 5286–5290 (2015).
- [151] **Artificial rheotaxis.** J. Palacci, S. Sacanna, A. Abramian, J. Barral, K. Hanson, A. Y. Grosberg, D. J. Pine, and P. M. Chaikin. *Science Advances* **1**, e1400214 (2015).
- [152] **Binding kinetics of lock and key colloids.** L. Colón-Meléndez, D. J. Beltran-Villegas, G. van Anders, J. Liu, M. Spellings, S. Sacanna, D. J. Pine, S. C. Glotzer, R. G. Larson, and M. J. Solomon. *J. Chem. Phys.* **142**, 174909 (2015).
- [153] **Crystallization of DNA-coated colloids.** Y. Wang, Y. Wang, X. Zheng, E. Ducrot, J. S. Yodh, M. Weck, and D. J. Pine. *Nature Commun.* **6**, 7253 (2015).
- [154] **Synthetic strategies toward DNA-coated colloids that crystallize.** Y. Wang, Y. Wang, X. Zheng, E. Ducrot, M.-G. Lee, G.-R. Yi, M. Weck, and D. J. Pine. *J. Am. Chem. Soc.* **137**, 10760–10766 (2015).
- [155] **High-density PEO-b-DNA brushes on polymer particles for colloidal superstructures.** J. S. Oh, Y. Wang, D. J. Pine, and G.-R. Yi. *Chem. Mater.* **27**, 8337–8344 (2015).
- [156] **Scattering techniques.** L. Cipelletti, V. Trappe, and D. J. Pine. In A. Fernandez-Nieves and A. M. Puertas, editors, *Fluids, Colloids, and Soft Materials: An Introduction to Soft Matter Physics*, volume 7, chapter 8, pp. 133–148. John Wiley & Sons (2016).
- [157] **Thermal Regulation of Colloidal Materials Architecture through Orthogonal Functionalizable Patchy Particles.** X. Zheng, Y. Wang, Y. Wang, D. J. Pine, and M. Weck. *Chem. Mater.* **28**, 3984–3989 (2016).
- [158] **Colloidal alloys with preassembled clusters and spheres.** E. Ducrot, M. He, G.-R. Yi, and D. J. Pine. *Nat Mater* **16**, 652–657 (2017).
- [159] **Shape-shifting patchy particles.** X. Zheng, M. Liu, M. He, D. J. Pine, and M. Weck. *Angewandte Chemie* **129**, 5599–5603 (2017).