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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	Julius, Roslyn, & Enid Silver Professor	2013–present
	Professor of Physics	2005–present
	Professor of Chemical & Biomolecular Eng.	2021–present
	Professor of Mathematics	2005–present
University of California, Santa Barbara	Chair, Dept. Chemical & Biomolecular Eng.	2014–2021
	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

Distinguished Visiting Professor of Chemical Engineering Pohang University of Science and Technology (POSTECH) University, South Korea	2021–present
Fellow Professor of Chemical & Biomolecular Engineering Sungkyunkwan University, Suwon, South Korea	2012–2021
Fellow, American Academy of Arts and Sciences	2018
Member, BP Technology Advisory Council (Review BP technology and advise BP's Executive Team)	2016–2020
Emilio Segre Distinguished Lectures of the Raymond & Beverly Sackler Foundation Professor Yuval Ne'eman Memorial Lecture, Tel-Aviv University, Israel	2016
Michelin Chair Visiting Professorship, ESPCI ParisTech, Paris, France	2015–2016
Founding Director of the Center for Soft Mater Research, New York University	2005–2014
Co-Director of the NYU Materials Research Science & Engineering Center (MRSEC), New York University	2008–2014
Adjunct Professor of Chemical Engineering, KAIST	2001–2012

Korean Advanced Institute for Science & Technology, Daejeon, South Korea	
Chair and member of the Executive Committee	2007–2011
of the Division of Condensed Matter Physics, American Physical Society	
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
Ecole 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

## Research Interests

Research interests encompass self-assembly and the dynamical, structural, optical, and rheological, properties of soft materials, including colloidal and noncolloidal particle suspensions, emulsions, surfactant solutions, and polymer solutions. Current projects include the development of photonic crystals using emulsion and colloidal templating techniques, the development and study of colloids with non-spherically symmetric potentials, lock-and-key colloids, DNA-coated colloids, and reversibility and non-equilibrium phase transitions in periodically driven systems. There is also ongoing activity in the development of optical probes of these materials, including diffusing-wave spectroscopy, light scattering microscopy, light scattering from sheared fluids, and total internal reflection microscopy.

## Research overview

**Diffusing-Wave Spectroscopy:** Developed diffusing-wave spectroscopy (DWS), the extension of dynamic light scattering to systems that multiply scatter light, as a quantitative tool for measuring dynamics in complex fluids. Developed models for diffuse reflection, polarization effects, particle correlations, and shear in DWS. Using multispeckle techniques, extended DWS to measure dynamics over 10 decades in time. Developed pulsed DWS. Refs. [6, 9, 10, 12, 15, 16, 17, 18, 19, 24, 29, 34, 35, 40, 55, 79]

**Light Scattering in sheared systems:** Developed DWS as well as dynamic and forced-Rayleigh light scattering techniques as tools for quantitative measurements of the effects of shear flow on the structure and dynamics of complex fluids. Refs. [8, 12, 21, 22, 52, 55, 62]

**Transition from ballistic to diffusive Brownian motion:** Used DWS to measure the transition from ballistic to diffusive Brownian motion in colloidal suspensions, which required resolving sub-nanometer scale motion of micron-sized colloidal spheres. Demonstrated that hydrodynamic interactions lead to a power-law decay rather than the exponential decay of the velocity autocorrelation function that is predicted by classical Langevin theory. Refs. [9, 18, 34]

- Structure and dynamics of coarsening in foams:** First experimental measurements of coarsening dynamics in foams. Non-invasive bulk measurements of temporal evolution of foam cell size confirmed that foams coarsen by Ostwald ripening. Refs. [21, 25]
- Shear-enhanced concentration fluctuations in polymer solutions:** Used light scattering to show that concentration fluctuations are enhanced by shear flow in a fashion that is largely consistent with a model developed by Helfand and Fredrickson (HF) and inconsistent with several competing models. Showed that an additional relaxation mode, not present in the HF theory, is required to explain the development and relaxation of shear-induced structures. Refs. [22, 33, 51, 82]
- Entropically-driven crystallization of colloids at surfaces:** Discovered that the depletion interaction can lead to surface (and bulk) crystallization. Refs. [43, 50]
- Entropic Control of Particle Motion Using Passive Surface Microstructures:** Measured the entropic binding potential to surfaces and showed how surface patterning can lead to the control of particle adsorption and motion in binary colloidal mixtures. Ref. [53]
- Shear-thickening and inhomogeneous structures of wormlike micelles:** Discovered the formation of inhomogeneous gel-like structures as well as re-entrant and chaotic rheological behavior in wormlike micelle solutions. Refs. [52, 60, 62, 63]
- Yielding of dense emulsions:** Discovered that dense emulsions yield by the inhomogeneous nucleation of isolated liquid-like domains of droplets and that irreversible particle motion sharply increases beyond a critical strain, which is in close agreement with the strain beyond which the stress-strain relation probed significantly departs from linearity. Ref. [55, 146]
- Inverse opals for photonic materials:** Developed the emulsion templating method as the first means for making so-called inverse opal photonic crystal structures. Extended colloidal templating methods to produce highly ordered photonic crystals with optical stop bands. Refs. [58, 67, 76]
- Hierarchically porous metal oxides:** Developed hierarchically ordered metal-oxide porous structures and monoliths with very large internal surface area for applications in optics, catalysis, and structural materials. Refs. [69, 74, 75, 65, 90]
- Colloidal clusters and molecules:** Developed minimal moment clusters and emulsion encapsulation methods for use as building blocks for photonic and other colloidal structures. Further developed clusters to make colloids with controllable directional interactions for use as colloidal molecules. Developed methods to make macroporous colloidal particles for optical applications. Refs. [80, 81, 84]
- Nanoparticle localization and phase transitions in diblock copolymers:** Refs. [97, 101, 112, 115, 122] Demonstrated how nanoparticles can be localized in either phase of a diblock copolymer by varying the composition of ligands on the nanoparticle surfaces.
- Reversibility/Irreversibility transition and random organization in sheared suspensions:** Discovered and characterized the reversibility/irreversibility transition in periodically sheared suspensions and elucidated the associated process of *random organization*. Showed how the introduction of gravity can lead to self-organized critical states. Refs. [104, 117, 123, 145, 174]
- Lock-and-key colloids:** Developed and characterized lock-and-key interactions between colloidal particles with shape complementarity using the depletion interaction. Refs. [124, 137, 144, 152]
- Light-Activated Colloidal Surfers:** Studied light-activated suspension of colloidal surfers and showed that they self-organize into two-dimensional “living crystals,” which form, break, explode, and re-form elsewhere. Showed that the existence of living crystals is intrinsically related to the out-of-equilibrium collisions of the self-propelled particles. Refs. [136, 141, 148, 151]
- DNA-coated colloids:** Developed a variety of methods to achieve high-density coatings of DNA brushes on colloidal particles, which improves thermally-reversible DNA-mediated binding between colloids and facilitates the growth of colloidal crystals. Studied reconfigurable crystal transitions by combining dense DNA-coatings with toe-hold displacement. Refs. [153, 154, 155, 168]

**Patchy colloids with directional interactions and valence:** Developed a general method for creating the colloidal analogs of atoms with valence with chemically distinct surface patches that imitate hybridized atomic orbitals,  $sp^2$ ,  $sp^3$ , etc. Functionalized patches with DNA sticky ends to form programmable, specific, reversible, and directional bonds between colloids. Ref. [135]

**Janus colloids:** Developed scalable method for making Janus colloids with well defined Janus balance that can be controllably varied from 1% to 81%. Observed new colloidal structures, including colloidal micelles, fibers, and lamellae depending on the Janus balance. Developed ability to dynamically reconfigure Janus particle assemblies between chain-like and lamellar structures using toehold exchange and by exploiting ability to orthogonally functionalize both sides. Ref. [166, 168, 175]

**Self-assembly of colloidal superstructures:** Introduced new design principle for self-assembly based on preassembled components that allows the formation of otherwise unattainable low-coordination structures. Demonstrated the approach using preassembled colloidal tetrahedra and spheres, which resulted in the formation of diamond and pyrochlore sublattices never assembled before. Ref. [158, 162]

**Self-assembly of colloidal diamond:** Developed first method to self-assemble colloidal cubic diamond, which is valuable for its optical properties. Ref. [173]

**Photon-counting effects on TIRM:** Showed that the effects of photon-counting statistics can limit the resolution of measurements using total internal reflection microscopy (TIRM) of short-range colloidal potentials and provided a quantitative accounting of the effect, which had gone unnoticed for more than three decades. Ref. [180]

## Publications

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## Books

**Introduction to Python for Science & Engineering** (Series in Computational Physics). David J. Pine. Boca Raton, FL, CRC Press, 2019, Taylor & Francis Group (368 pages).

## Journal Articles (see also *Google Scholar*)

- [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.-I. 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.-I. 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 Polym. Sci.* **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 (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 (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. Natl. Acad. Sci. U.S.A.* **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. *Nat. 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. Natl. Acad. Sci. U.S.A.* **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. *Nat. 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).
- [160] **Compressible colloidal clusters from pickering emulsions and their DNA functionalization.** I.-S. Jo, J. S. Oh, S.-H. Kim, D. J. Pine, and G.-R. Yi. *Chem. Commun.* **54**, 8328–8331 (2018).
- [161] **DNA-functionalized 100-nm polymer nanoparticles from block copolymer micelles.** S. Lee, J. H. Yoon, I.-S. Jo, J. S. Oh, D. J. Pine, T. S. Shim, and G.-R. Yi. *Langmuir* **34**, 11042–11048 (2018).
- [162] **Pyrochlore lattice, self-assembly and photonic band gap optimizations.** E. Ducrot, J. Gales, G.-R. Yi, and D. J. Pine. *Opt. Express* **26**, 30052 (2018).
- [163] **DNA-coated microspheres and their colloidal superstructures.** J. Moon, I.-S. Jo, E. Ducrot, J. S. Oh, D. J. Pine, and G.-R. Yi. *Macromol. Res.* **26**, 1085–1094 (2018).
- [164] **Optimizing the synthesis of monodisperse colloidal spheres using holographic particle characterization.** C. Middleton, M. D. Hannel, A. D. Hollingsworth, D. J. Pine, and D. G. Grier. *Langmuir* **35**, 6602–6609 (2019).
- [165] **DNA functionalization of colloidal particles via physisorption of azide-functionalized diblock copolymers.** J. Moon, I.-S. Jo, J. H. Yoon, Y. Kim, J. S. Oh, D. J. Pine, and G.-R. Yi. *Soft Matter* **15**, 6930–6933 (2019).
- [166] **Colloidal fibers and rings by cooperative assembly.** J. S. Oh, S. Lee, S. C. Glotzer, G.-R. Yi, and D. J. Pine. *Nat. Commun.* **10**, 3936 (2019).
- [167] **Assembly of clathrates from tetrahedral patchy colloids with narrow patches.** E. G. Noya, I. Zubieta, D. J. Pine, and F. Sciortino. *J. Chem. Phys.* **151**, 094502 (2019).
- [168] **High-density DNA coatings on carboxylated colloids by DMTMM- and azide-mediated coupling reactions.** J. S. Oh, M. He, G.-R. Yi, and D. J. Pine. *Langmuir* **36**, 3583–3589 (2020).
- [169] **Reconfigurable self-assembly and kinetic control of multiprogrammed DNA-coated particles.** J. S. Oh, G.-R. Yi, and D. J. Pine. *ACS Nano* **14**, 4595–4600 (2020).
- [170] **Photo-printing of faceted DNA patchy particles.** J. A. Diaz A., J. S. Oh, G.-R. Yi, and D. J. Pine. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 10645–10653 (2020).
- [171] **Tunable assembly of hybrid colloids induced by regioselective depletion.** M. Liu, X. Zheng, V. Grebe, D. J. Pine, and M. Weck. *Nat. Mater.* **18**, 1354–1361 (2020).
- [172] **Kinetics of actin networks formation measured by time resolved particle-tracking microrheology.** M. Levin, R. Sorkin, D. Pine, R. Granek, A. Bernheim-Groswasser, and Y. Roichman. *Soft Matter* **16**, 7869–7876 (2020).
- [173] **Colloidal diamond.** M. He, J. P. Gales, É. Ducrot, Z. Gong, G.-R. Yi, S. Sacanna, and D. J. Pine. *Nature* **585**, 524–529 (2020).
- [174] **Hyperuniform structures formed by shearing colloidal suspensions.** S. Wilken, R. E. Guerra, D. J. Pine, and P. M. Chaikin. *Phys. Rev. Lett.* **125**, 148001 (2020).

- [175] **Reconfigurable transitions between one- and two-dimensional structures with bifunctional DNA-coated Janus colloids.** J. S. Oh, G.-R. Yi, and D. J. Pine. *ACS Nano* **14**, 15786–15792 (2020).
- [176] **Two-dimensional (2D) or quasi-2D superstructures from DNA-coated colloidal particles.** M. Liu, X. Zheng, V. Grebe, M. He, D. J. Pine, and M. Weck. *Angew. Chem. Int. Ed.* **60**, 5744–5748 (2021).
- [177] **Large-scale synthesis of colloidal bowl-shaped particles.** K. V. Edmond, T. P. Jacobson, J. S. Oh, G.-R. Yi, A. D. Hollingsworth, S. Sacanna, and D. J. Pine. *Soft Matter* **17**, 6176–6181 (2021).
- [178] **Colloidal particles with triangular patches.** M. He, J. P. Gales, X. Shen, M. J. Kim, and D. J. Pine. *Langmuir* **37**, 7246–7253 (2021).
- [179] **Patchy colloidal clusters with broken symmetry.** Y.-J. Kim, J.-H. Kim, I.-S. Jo, D. J. Pine, S. Sacanna, and G.-R. Yi. *J. Am. Chem. Soc.* **143**, 13175–13183 (2021).
- [180] **Effect of photon counting shot noise on total internal reflection microscopy.** F. Cui and D. J. Pine. *Soft Matter* **18**, 161–171 (2022).
- [181] **Ultrasonic chaining of emulsion droplets.** M. A. Abdelaziz, J. A. Díaz A., J.-L. Aider, D. J. Pine, D. G. Grier, and M. Hoyos. *Phys. Rev. Research* **3**, 043157 (2021).
- [182] **Comprehensive view of microscopic interactions between DNA-coated colloids.** F. Cui, S. Marbach, J. A. Zheng, M. Holmes-Cerfon, and D. J. Pine. *Nature Communications* **13**, 2304 (2022).