

30 January 2012

Curriculum Vitæ

Randall D. Kamien

Vicki and William Abrams Professor in the Natural Sciences

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| Current Positions | 2006– 2003– 2012– | Vicki and William Abrams Professor in the Natural Sciences Professor of Physics and Astronomy Editorial Board, Physics Reports |
| Education | 1992 1988 1988 | Ph.D., Physics, Harvard University M.S., Physics, California Institute of Technology B.S., California Institute of Technology |
| Prior Positions | 2009–2010 2006–2010 2006–2007 2006 2001–2005 2000–2005 2000–2003 2000–2003 May 1998 1997–2000 1995–1997 Fall 1995 1992–1995 | Member, School of Mathematics, Institute for Advanced Study Associate Editor, Reviews of Modern Physics Associate Chair for Graduate Affairs Edmund J. and Louise W. Kahn Endowed Term Professor William Smith Term Professor in the School of Arts & Sciences Associate Chair for Graduate Affairs Associate Professor of Physics and Astronomy Associate Editor, Physical Review E Professeur Invité, Université Paris XI, Orsay, France Assistant Professor of Physics and Astronomy Postdoctoral Research Associate, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA Visiting Scientist, Center for Studies in Physics and Biology, The Rockefeller University, New York, NY Member, School of Natural Sciences, Institute for Advanced Study, Princeton, NJ |
| Awards & Honors | 2010 2003 2001 1999–2001 1998–2002 1997 | Samsung Mid-Career Award, International Liquid Crystal Society Fellow, American Association for the Advancement of Science Fellow, American Physical Society (DCMP) Fellow, Alfred P. Sloan Foundation CAREER Award, National Science Foundation Research Innovation Award, Research Corporation |

Peer-Reviewed Publications

1. R.D. Kamien, H.D. Politzer and M.B. Wise, “Universality of Random-Matrix Predictions for the Statistics of Energy Levels”, *Phys. Rev. Lett.* **60** (1988) 1995–1998.
2. L. Balents, R.D. Kamien, P. Le Doussal and E. Zaslav, “On the Isotropic-Nematic Transition for Polymers in Liquid Crystals”, *J. Phys. I France* **2** (1992) 263–272.
3. R.D. Kamien, P. Le Doussal and D.R. Nelson, “Theory of Directed Polymers”, *Phys. Rev. A* **45** (1992) 8727–8750. [cond-mat/9204007]
4. R.D. Kamien and D.R. Nelson, “Directed Polymer Melts and Quantum Critical Phenomena”, *J. Stat. Phys.* **71** (1993) 23–50. [cond-mat/9206006]
5. R.D. Kamien, “Flory Exponents from a Self-Consistent Renormalization Group”, *J. Phys. I France* **3** (1993) 1663–1670. [cond-mat/9304004]
6. R.D. Kamien, P. Le Doussal and D.R. Nelson, “Rotational Invariance and the Theory of Directed Polymer Nematics”, *Phys. Rev. E* **48** (1993) 4116–4117. [cond-mat/9306021]
7. R.D. Kamien and T.C. Lubensky, “Twisted Line Liquids”, *J. Phys. I France* **3** (1993) 2131–2138. [cond-mat/9306043]
8. R.D. Kamien and D.R. Nelson, “Iterated Moiré Maps and Braiding of Chiral Polymer Crystals”, *Phys. Rev. Lett.* **74** (1995) 2499–2502. [cond-mat/9411039]
9. R.D. Kamien and J. Toner, “Anomalous Elasticity of Polymer Cholesterics”, *Phys. Rev. Lett.* **74** (1995) 3181–3184. [cond-mat/9408041]
10. R.D. Kamien and D.R. Nelson, “Defects in Chiral Columnar Phases: Tilt Grain Boundaries and Iterated Moiré Maps”, *Phys. Rev. E* **53** (1996) 650–666. [cond-mat/9507080]
11. R.D. Kamien, “Liquids with Chiral Bond Order”, *J. Phys. II France* **6** (1996) 461–475. [cond-mat/9507023]
12. R.D. Kamien and G.S. Grest, “Structure Function of Polymer Nematic Liquid Crystals: A Monte Carlo Simulation”, *Phys. Rev. E* **55** (1997) 1197–1200. [cond-mat/9512157]
13. R.D. Kamien and T.C. Lubensky, “Chiral Lyotropic Liquid Crystals: TGB Phases and Helicoidal Structures”, *J. Phys. II France* **7** (1997) 157–163. [cond-mat/9605129]
14. A.B. Harris, R.D. Kamien and T.C. Lubensky, “On the Microscopic Origin of Cholesteric Pitch”, *Phys. Rev. Lett.* **78** (1997) 1476–1479; 2867 *erratum*. [cond-mat/9607084]
15. R.D. Kamien, T.C. Lubensky, P. Nelson and C.S. O’Hern, “Direct Determination of DNA Twist-Stretch Coupling”, *Europhys. Lett.* **38** (1997) 237–242. [cond-mat/9611224]
16. R.D. Kamien, “Smectic Order in Double-Twist Cylinders”, *J. Phys. II France* **7** (1997) 743–750. [cond-mat/9611021]
17. R.D. Kamien and T.R. Powers, “Determining the Anchoring Strength of a Capillary Using Topological Defects”, *Liq. Cryst.* **23** (1997) 213–216. [cond-mat/9612169]
18. J.D. Moroz and R.D. Kamien, “Self-Avoiding Walks with Writhe”, *Nucl. Phys. B* **506** (1997) 695–710. [cond-mat/9705066]
19. R.D. Kamien, “Local Writhing Dynamics”, *Eur. Phys. J. B* **1** (1998) 1–4. [cond-mat/9703137]
20. C.S. O’Hern, R.D. Kamien, T.C. Lubensky and P. Nelson, “Elasticity Theory of a Twisted Stack of Plates”, *Eur. Phys. J. B* **1** (1998) 95–102. [cond-mat/9707040]
21. J.E. Martin, J. Odinek, T.C. Halsey and R.D. Kamien, “Structure and Dynamics of Electrorheological Fluids”, *Phys. Rev. E* **57** (1998) 756–775.

22. R.D. Kamien, “Force-Free Configurations of Vortices in High-Temperature Superconductors near the Melting Transition”, *Phys. Rev. B* **58** (1998) 8218–8221. [cond-mat/9804287]
23. R.D. Kamien and T.C. Lubensky, “Minimal Surfaces, Screw Dislocations, and Twist Grain Boundaries”, *Phys. Rev. Lett.* **82** (1999) 2892–2895. [cond-mat/9808306]
24. M. Triantafillou and R.D. Kamien, “Polymer Shape Anisotropy and The Depletion Interaction”, *Phys. Rev. E* **59** (1999) 5621–5624. [cond-mat/9810234]
25. A.B. Harris, R.D. Kamien and T.C. Lubensky, “Molecular Chirality and Chiral Parameters”, *Rev. Mod. Phys.* **71** (1999) 1745–1757. [cond-mat/9901174]
26. R.D. Kamien, “Poisson Bracket Formulation of Nematic Polymer Dynamics”, *Phys. Rev. E* **61** (2000) 2888–2894. [cond-mat/9906339]
27. M.S. Spector, S.K. Prasad, B.T. Weslowski, R.D. Kamien, J.V. Selinger, B.R. Ratna and R. Shashidar, “Chiral Twisting of a Smectic-*A* Liquid Crystal”, *Phys. Rev. E* **61** (2000) 3977–3983. [cond-mat/0001202]
28. R.D. Kamien and Alex J. Levine, “Boundary Effects in Chiral Polymer Hexatics”, *Phys. Rev. Lett.* **84** (2000) 3109–3112. [cond-mat/9904010]
29. P. Zihlerl and R.D. Kamien, “Soap Froths and Crystal Structures”, *Phys. Rev. Lett.* **85** (2000) 3528–3531. [cond-mat/0007256]
30. R.D. Kamien, “Decomposition of the Height Function of Scherk’s First Surface”, *Appl. Math. Lett.* **14** (2001) 797–800. [math-ph/0008039]
31. R.D. Kamien and J.V. Selinger, “Order and Frustration in Chiral Liquid Crystals”, *J. Phys. Cond. Mat.* **13** (2001) R1–R22. [cond-mat/0009094]
32. I. Bluestein, R.D. Kamien, and T.C. Lubensky, “Dislocation Geometry in the TGB_A Phase: Linear Theory”, *Phys. Rev. E* **63** (2001) 061702:11 pages. [cond-mat/0101270]
33. P. Zihlerl and R.D. Kamien, “Maximizing Entropy by Minimizing Area: Towards a New Principle of Self-Organization”, *J. Phys. Chem. B* **105** (2001) 10147–10158 *Feature Article*. [cond-mat/0103171]
34. W. Kung, P. Zihlerl and R.D. Kamien, “The Foam Analogy in Charged Colloidal Crystals”, *Phys. Rev. E* **65** (2002) 050401(R):4 pages *Rapid Communication*; erratum **68** (2003) 049905. [cond-mat/0111313]
35. I. Bluestein and R.D. Kamien, “Nonlinear Effects in the TGB_A Phase”, *Europhys. Lett.* **59** (2002) 68–74. [cond-mat/0201035]
36. R.D. Kamien, “The Geometry of Soft Materials: A Primer”, *Rev. Mod. Phys.* **74** (2002) 953–971. [cond-mat/0203127]
37. B.A. DiDonna and R.D. Kamien, “Smectic Phases with Cubic Symmetry: The Splay Analog of the Blue Phase”, *Phys. Rev. Lett.* **89** (2002) 215504:4 pages. [cond-mat/0206189]
38. C.D. Santangelo and R.D. Kamien, “Bogomol’nyi, Prasad and Sommerfield Configurations in Smectics”, *Phys. Rev. Lett.* **91** (2003) 045506:4 pages. [cond-mat/0303532]
39. G.M. Grason, B.A. DiDonna and R.D. Kamien, “Geometric Theory of Diblock Copolymer Phases”, *Phys. Rev. Lett.* **91** (2003) 058304:4 pages.
40. W. Kung and R.D. Kamien, “Topological Constraints at the Theta Point: Closed Loops at Two Loops”, *Europhys. Lett.* **64** (2003) 323–329. [cond-mat/0305026]
41. B.A. DiDonna and R.D. Kamien, “Smectic Blue Phases: Layered Systems with High Intrinsic Curvature”, *Phys. Rev. E* **68** (2003) 041703: 11 pages. [cond-mat/0307149]
42. Z. Dogic, J. Zhang, A.W.C. Lau, H. Aranda-Espinoza, P. Dalhaimer, D.E. Discher, P.A. Janmey, R.D. Kamien, T.C. Lubensky, and A.G. Yodh, “Elongation and Fluctuations of Semi-flexible Polymers in a Nematic Solvent”, *Phys. Rev. Lett.* **92** (2004)

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43. W. Kung, P. Ziherl, and R.D. Kamien, “The Foam Analogy: From Phases to Elasticity”, *J. Col. Int. Sci.* **275** (2004) 539–547. [cond-mat/0310686]
 44. G.M. Grason and R.D. Kamien, “Interfaces in Diblocks: A Study of Mikroarm Star Copolymers”, *Macromolecules* **37** (2004) 7371–7380; erratum **38** (2005) 2022. [cond-mat/0404409]
 45. Y. Snir and R.D. Kamien, “Entropically Driven Helix Formation”, *Science* **307** (2005) 1067. [cond-mat/0502520]
 46. G.M. Grason and R.D. Kamien, “Self-Consistent Field Theory of Multiply-Branched Block Copolymer Melts”, *Phys. Rev. E* **71** (2005) 051801: 11 pages. *Chosen to appear in the 30 May 2005 Virtual Journal of Nanoscale Science and Technology* [cond-mat/0501404]
 47. C.D. Santangelo and R.D. Kamien, “Curvature and Topology in Smectic-A Liquid Crystals”, *Proc. R. Soc. A* **461** (2005) 2911–2921.
 48. M.A. Ambroso, R.D. Kamien, and D.J. Durian, “Dynamics of Shallow Impact Cratering”, *Phys. Rev. E* **72** (2005) 041305: 4 pages. [cond-mat/0503454]
 49. J.R. Banavar, M. Cieplak, A. Flammini, T.X. Hoang, R.D. Kamien, T. Lezon, D. Marenduzzo, A. Maritan, F. Seno, Y. Snir, and A. Trovato, “Geometry of Proteins: Hydrogen Bonding, Sterics and Marginally Compact Tubes”, *Phys. Rev. E* **73** (2006) 031921: 5 pages. *Chosen to appear in the 1 April 2006 Virtual Journal of Biological Physics Research* [q-bio.BM/0505052]
 50. C.D. Santangelo and R.D. Kamien, “Elliptic Phases: A Study of the Nonlinear Elasticity of Twist-Grain Boundaries”, *Phys. Rev. Lett.* **96** (2006) 137801: 4 pages. [cond-mat/0511740]
 51. R.D. Kamien and C.D. Santangelo, “Smectic Liquid Crystals: Materials with One-Dimensional, Periodic Order”, *Geometriae Dedicata* **120** (2006) 229–240. [math.DG/0601494]
 52. K. Feitosa, O.L. Halt, R.D. Kamien, and D.J. Durian, “Bubble Kinetics in a Steady-State Column of Aqueous Foam”, *Europhys. Lett.* **76** (2006) 683–689. [cond-mat/0609477]
 53. C.D. Santangelo and R.D. Kamien, “Triply Periodic Smectic Liquid Crystals”, *Phys. Rev. E* **75** (2007) 011702: 12 pages. [cond-mat/0609596]
 54. Y. Snir and R.D. Kamien, “Helical Tubes in Crowded Environments”, *Phys. Rev. E* **75** (2007) 051114: 9 pages. *Chosen to appear in the 4 June 2007 Virtual Journal of Nanoscale Science and Technology and the 1 June 2007 Virtual Journal of Biological Physics Research* [cond-mat/0612243]
 55. M.A. Glaser, G.M. Grason, R.D. Kamien, A. Košmrj, C.D. Santangelo, and P. Ziherl, “Soft Spheres Make More Mesophases”, *Europhys. Lett.* **78** (2007) 46004: 5 pages. [cond-mat/0609570]
 56. R.D. Kamien and A.J. Liu, “Why is Random Close Packing Reproducible?”, *Phys. Rev. Lett.* **99** (2007) 155501: 4 pages. [cond-mat/0701343]
 57. C.D. Santangelo, V. Vitelli, R.D. Kamien, and D.R. Nelson, “Geometric Theory of Columnar Phases on Curved Substrates”, *Phys. Rev. Lett.* **99** (2007) 017801: 4 pages. *Selected as Editors’ Suggestion. Chosen to appear in the 23 July 2007 Virtual Journal of Nanoscale Science and Technology* [cond-mat/0703206]
 58. C.D. Modes and R.D. Kamien, “Hard Discs on the Hyperbolic Plane”, *Phys. Rev. Lett.* **99** (2007) 235701: 4 pages. [arXiv:0708.4334]
 59. Y. Zhang, E.A. Matsumoto, A. Peter, P.-C. Lin, R.D. Kamien, and S. Yang, “One-step Nanoscale Assembly of Complex Structures via Harnessing of an Elastic Instability”,

- Nano Letters* **8** (2008) 1192–1196. [DOI:10.1021/nl0801531]
60. C.D. Modes and R.D. Kamien, “Geometrical Frustration in Two Dimensions: Idealizations and Realizations of a Hard Disc Fluid in Negative Curvature”, *Phys. Rev. E* **77** (2008) 041125: 14 pages. Chosen to appear in the 1 May 2008 Virtual Journal of Biological Physics Research [arXiv:0801.1166]
 61. C.D. Modes and R.D. Kamien, “Spherical Foams in Flat Space”, *submitted* (2008). [arXiv:0810.5724]
 62. B.G. Chen and R.D. Kamien, “Nematic Films and Radially Anisotropic Delaunay Surfaces”, *Eur. Phys. J. E* **28** (2009) 315–329. [arXiv:0811.2193]
 63. E.A. Matsumoto and R.D. Kamien, “Elastic Instability Triggered Pattern Formation”, *Phys. Rev. E* **80** (2009) 021604: 15 pages. Chosen to appear in the 24 August 2009 Virtual Journal of Nanoscale Science and Technology [arXiv:0902.3627]
 64. B.G. Chen, G.P. Alexander, and R.D. Kamien, “Symmetry breaking in smectics and surface models of their singularities”, *Proc. Natl. Acad. Sci. USA*, **106** (2009) 15577–15582 [10.1073/pnas.0905242106]. [arXiv:0905.3535]
 65. V. Vitelli, B. Jain, and R.D. Kamien, “Topological Defects in Gravitational Lensing Shear Fields”, *JCAP* **09**(2009) 034. [arXiv:0906.0124]
 66. R.D. Kamien, D.R. Nelson, C.D. Santangelo, and V. Vitelli, “Extrinsic Curvature, Geometric Optics, and Lamellar Order on Curved Substrates”, *Phys. Rev. E* **80** (2009) 051703: 12 pages. Chosen to appear in the 30 November 2009 Virtual Journal of Nanoscale Science and Technology [arXiv:0908.4358]
 67. E.A. Matsumoto, G.P. Alexander, and R.D. Kamien, “Helical Nanofilaments and the High Chirality Limit of Smectics-A”, *Phys. Rev. Lett.* **103** (2009) 257804: 4 pages. Chosen to appear in the 4 January 2010 Virtual Journal of Nanoscale Science and Technology [arXiv:0909.3529]
 68. S.M. Loverde, V. Ortiz, R.D. Kamien, M.L. Klein, and D.E. Discher, “Curvature-driven Molecular Demixing in the Budding and Breakup of Mixed Component Worm-like Micelles”, *Soft Matter* **6** (2010) 1419–1425. [DOI:10.1039/b919581e]
 69. M.A. Lohr, A.M. Alsayed, B.G. Chen, Z. Zhang, R.D. Kamien, and A.G. Yodh, “Helical Packings and Phase Transformations of Soft Spheres in Cylinders”, *Phys. Rev. E* **81** (2010) 040401(R): 4 pages *Rapid Communication*. [arXiv:1004.0362]
 70. G.P. Alexander, B.G. Chen, E.A. Matsumoto, and R.D. Kamien, “Power of the Poincaré Group: Elucidating the Hidden Symmetries in Focal Conic Domains”, *Phys. Rev. Lett.* **104** (2010) 257802: 4 pages. [arXiv:1004.0465]
 71. P. Ziherl and R.D. Kamien, “From Lumps to Lattices: Crystallized Clusters Made Simple”, *J. Phys. Chem. B* **112** (2011) 7200–7205. [arXiv:1009.5288] [DOI:10.1021/jp109330p]
 72. G.P. Alexander, B.G. Chen, E.A. Matsumoto, and R.D. Kamien, “Disclination Loops, Point Defects, and All That in Nematic Liquid Crystals”, *to appear in Rev. Mod. Phys.* (2011). [arXiv:1107.1169]
 73. A. Honglawan, D.A. Beller, M. Cavallaro, R.D. Kamien, K.J. Stebe, and S. Yang, “Pillar Assisted Epitaxial Assembly of Toric Focal Conic Domains of Smectic-A Liquid Crystals”, *Adv. Mater.* **23** (2011) 5519–5523. [DOI:10.1002/adma.201103008]
 74. E.A. Matsumoto, C.D. Santangelo, and R.D. Kamien, “Smectic Pores and Defect Cores”, *to appear in Interface Focus* (2012). [arXiv:1110.0664]
 75. G.P. Alexander, R.D. Kamien, and C.D. Santangelo, “Developed Smectics: When Exact Solutions Agree”, *Phys. Rev. Lett.* **108** (2012) 047802: 5 pages. [arXiv:1110.4289]
 76. E.A. Matsumoto and R.D. Kamien, “Patterns on a Roll: A Method of Continuous Feed Nanoprinting”, *submitted* (2011).
 77. G.P. Alexander, R.D. Kamien, and Ricardo A. Mosna, “Conformal Smectics and their

Many Metrics”, *submitted* (2011). [arXiv:1111.7282]

Conference Proceedings, Commentaries, Reviews, and Book Chapters

1. D.R. Nelson and R.D. Kamien, “Polymer Braids and Iterated Moiré Maps”, in *The Legacy of Norbert Wiener; A Special Symposium in Honor of the 100th Anniversary of Norbert Wiener’s Birth*, edited by D. Jerison, I.M. Singer and D.W. Stroock (American Mathematical Society, Providence, RI, 1997). [cond-mat/9412119]
2. T.C. Lubensky, R.D. Kamien and H. Stark, “Chiral Fluctuations and Structures”, in *Proceedings of “Liquid Crystals and Supramolecular Order”, Bangalore, India, (Mol. Cryst. Liq. Cryst. 288 (1996) 15–23)*. [cond-mat/9512163]
3. R.D. Kamien, “Weak Chirality in Ordered DNA Phases”, in *Proceedings of “The 16th International Liquid Crystal Conference”, Kent, OH, USA, (Mol. Cryst. Liq. Cryst. 299 (1997) 265–275)*. [cond-mat/9606028]
4. C.S. O’Hern, R.D. Kamien, T.C. Lubensky and P. Nelson, “Twist-Stretch Elasticity of DNA”, in *Statistical Mechanics in Physics and Biology, MRS Proceedings Vol. 463*, edited by D. Wirtz, T.C. Halsey and J. Van Zanten (Materials Research Society, Pittsburgh, 1997). [cond-mat/9612085]
5. T.C. Lubensky, A.B. Harris, R.D. Kamien and G. Yan, “Chirality in Liquid Crystals: From Microscopic Origins to Macroscopic Structure”, in *Proceedings of “The 6th International Conference on Ferroelectric Liquid Crystals”, Brest, France, (Ferroelectrics 212 (1998) 1–20)*. [cond-mat/9710349]
6. R.D. Kamien, “Chiral Mesophases of DNA”, in *Proceedings of “The 35th Annual Technical Meeting of the Society of Engineering Science”, Pullman, WA, (International Journal of Engineering Science 38 (2000) 1025–1032)*. [cond-mat/9812128]
7. S. Fraden and R.D. Kamien, “Self-Assembly *in Vivo*”, *Biophys. J.* **78** (2000) 2189–2190.
8. R.D. Kamien, “Chiral Interactions and Structures”, *Proceedings of “The VIIIth International Topical Meeting on Optics of Liquid Crystals”, Humacao, PR, (Mol. Cryst. Liq. Cryst. 358 (2001) 97–101)*. [cond-mat/9908277]
9. R.D. Kamien, “Review of *Physical Properties of Liquid Crystals: Nematics*, by Dunmur and Luckhurst”, *Liq. Cryst. Today* **11:1** (2002).
10. R.D. Kamien, “Soap Froths and Crystal Structures”, *Proceedings of “TH-2002: International Conference on Theoretical Physics”, Paris, France, (Ann. Henri Poincaré, 4, Suppl. 2 (2003) S679–S681)*.
11. R.D. Kamien, “Topology from the Bottom Up”, *Science* **299** (2003) 1671–1673. [cond-mat/0303353]
12. D.E. Discher and R.D. Kamien, “Towards Precision Micelles”, *Nature* **430** (2004) 519–520.
13. R.D. Kamien and M. Kaul, “Nice planet, shame about the human race”, *Nature* **434** (2005) 1067.
14. R.D. Kamien, “Review of *Bicontinuous Liquid Crystals*, by Lynch and Spicer”, *Liq. Cryst. Today* **15** (2006).
15. R.D. Kamien, “Better Geometry through Chemistry”, *Science* **315** (2007) 1083–1084.
16. R.D. Kamien, “Entropic Attraction and Ordering”, in *Soft Matter: Volume 3, Colloidal Order: Entropic and Surface Forces*, ed. by G. Gompper and M. Schick, (Wiley-VCH, Weinheim, 2007), pp. 1–40.
17. R.D. Kamien, “Knot Your Simple Defect Lines?”, *Science* **333** (2011) 46–47.

Patents

1. "Patterning Structures Using Deformable Substrates", S. Yang, Y. Zhang, R.D. Kamien, J.M. Kikkawa, E. Mastumoto, and D. Chandra. Filed 23 April 2008 (PCT/US2008/061293).

Invited Presentations

1. "Grain Boundaries and Braiding of Chiral Polymer Crystals", Liquid Crystal Gordon Research Conference, June 1995.
2. "Twisting and Braiding of Chiral Polymer Crystals", Materials Research Society Meeting, Complex Fluids Symposium, Fall 1995.
3. "The Origin of Cholesteric Pitch", Symposium on Liquid Crystals, Colloids and Emulsions, Laboratory for Research on the Structure of Matter, University of Pennsylvania, May 1996.
4. "Weak Chirality in Ordered DNA Phases", 16th International Liquid Crystal Conference, June 1996.
5. "Chiral Mesophases of DNA", 1997 March Meeting of the American Physical Society, Session on Physical Properties of DNA, March 1997.
6. "Chiral Mesophases of DNA", National Institutes of Health Workshop on Interaction between DNA Double Helices: Chirality and Structure of DNA Liquid-Crystals, June 1997.
7. "Chiral Interactions and Structures", Materials Research Society Meeting, Complex Fluids and Biomaterials Symposium, Fall 1997.
8. "The Mystery of the Missing Chirality", Aspen Center for Physics Winter Workshop on Defects in Soft Condensed Matter, January 1998.
9. "Chiral and Polymer Liquid Crystals", International Centre for Theoretical Physics Spring College on The Statistical Mechanics and Dynamics of Soft Condensed Matter, May 1998 (*4 Lectures*).
10. "Chiral Mesophases of DNA", 35th Annual Technical Meeting of the Society of Engineering Science, Eringen Medal Symposium, September 1998.
11. "Scherk's First Surface, Twist Grain Boundaries and All That", 1999 March Meeting of the American Physical Society, Session on Defects in Polymers and Soft Materials, March 1999.
12. "Minimal Surfaces, Twist Grain Boundaries and All That", Liquid Crystal Gordon Research Conference, June 1999.
13. "The Microscopic Origin of Macroscopic Chirality", Complex Materials Conference in Honor of Philip A. Pincus, August 1999.
14. "Chiral Interactions and Structures", VIIIth International Topical Meeting on Optics of Liquid Crystals, September 1999.
15. "Scherk's First Surface, Twist Grain Boundaries and All That", 3rd Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, May 2000.
16. "The Microscopic Origin of Macroscopic Chirality", 3rd Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, May 2000.
17. "Minimal Surfaces and Topological Defects", Nonlinear Analysis: 2000 →, Courant Institute, New York University, May 2000.
18. "Macroscopic Chirality and Biaxial Correlations", Fall 2000 National Meeting of the American Chemical Society, Liquid Dynamics: Into the New Millennium, August 2000.

19. “Soap Froths and Crystal Structures”, 21st CNLS Annual Conference, Principles of Soft Matter, May 2001.
20. “Bees Do It”, 6th Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems, May 2001.
21. “Bees Do It”, 7th New England Quarterly Workshop on Complex Fluids, June 2001.
22. “Turn of the Screws”, 8th International Conference on Ferroelectric Liquid Crystals, August 2001.
23. “The Geometry of Soft Materials”, 2002 Boulder School for Condensed Matter and Materials Physics: Physics of Soft Condensed Matter, July 2002 (*4 lectures*).
24. “Minimal Surfaces and Crystal Structure”, Society for Industrial and Applied Mathematics (SIAM) 50th Anniversary and 2002 Annual Meeting, July 2002.
25. “Soap Froths and Crystal Structures”, TH-2002: International Conference on Theoretical Physics, July 2002.
26. “Packing Fuzzy Spheres”, Soft Matters, Laboratory for Research on the Structure of Matter, University of Pennsylvania, September 2002.
27. “The Geometry of Defect Phases”, Materials Research Society Meeting, Defect-Mediated Phenomena in Ordered Polymers Symposium, December 2002.
28. “Hard Spheres, Soap Froths and Self-Assembly”, 26th Asilomar Conference on Polymeric Materials, February 2003.
29. “Hard Spheres, Soap Froths and Self-Assembly”, Advanced Computation Inspired by Biological Processes Conference (NSF), April 2003.
30. “Geometric Approach to Self-Assembly”, Fall 2003 National Meeting of the American Chemical Society, September 2003.
31. “Geometric Frustration in Soft Materials”, Modeling of Soft Matter Workshop, Institute for Mathematics and Its Applications (IMA), September 2004.
32. “What’s Kelvin’s Problem?”, National Science Foundation Workshop on Opportunities in Materials Theory 2004, October 2004.
33. “Smectics with Three Dimensional Periodicity”, 2005 March Meeting of the American Physical Society, Session on Novel Ordering In Smectics and other Layered Systems, March 2005.
34. “What’s Kelvin’s Problem?”, Frontiers in Soft Condensed Matter Workshop, May 2005.
35. “The Geometry and Topology of Smectics”, 21st International Liquid Crystal Conference, July 2006 (*Plenary Lecture*).
36. “Geometry and Topology in Smectics”, Princeton Center for Complex Materials (PCCM) 2006 Summer School, August 2006 (*2 lectures*).
37. “Materials Geometry”, International Seminar on Applied Geometry in Andalusia, September 2006 (*4 lectures*).
38. “Spherical Phases of Diblocks”, 96th Statistical Mechanics Conference, Rutgers University, December 2006.
39. “Self-Assembly of Soft Spheres”, 81st ACS Colloid and Surface Science Symposium, June 2007 (*Keynote Lecture*).
40. “Defect Effects in Smectics”, Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical Aspects of Materials Science, May 2008.
41. “The Geometry of Topological Defects”, Geometrical Singularities and Singular Ge-

- ometries Workshop, Institute for Mathematics and Its Applications (IMA), July 2008.
42. “Geometry of Topological Defects in Soft Matter”, Workshop on Topology and Physics, Drexel University, September 2008.
 43. “What’s Kelvin’s Problem”, Colloquium Ehrenfestii, Leiden University, April 2009.
 44. “Geometry and Topology of Smectics”, Hougen Symposium on Frontiers of Liquid Crystals, University of Wisconsin, April 2009.
 45. “Smectic Topology, Topography, and Tomography”, Joint IAS-Rutgers workshop on Topology: Identifying Order in Complex Systems, Rutgers University, May 2009.
 46. “Geometry of Soft Materials”, Soft Solids and Complex Fluids Summer School, University of Massachusetts, Amherst, June 2009.
 47. “Smectics!”, Liquid Crystal Gordon Conference, June 2009.
 48. “Films and Layers: Nematics and Smectics”, Variational Problems for Curves and Surfaces and Related Topics, Nara Women’s University, Japan, June 2009.
 49. “Smectic Topology, Topography, and Tomography”, Variational Problems for Curves and Surfaces and Related Topics, Nara Women’s University, Japan, June 2009.
 50. “New Chiral Geometries”, Chirality, July 2009.
 51. “Focal Conics”, Complex energy landscapes and long time dynamics, Princeton Center for Theoretical Sciences, Princeton, November 2009.
 52. “Smectics!”, Annual Meeting of the International Institute for Complex Adaptive Matter, University of California, Davis, January 2010.
 53. “Smectic Topology”, 23rd International Liquid Crystal Conference, July 2010.
 54. “Hidden Symmetry in Focal Conics”, Confined Liquid Crystals: Landmarks and Perspectives, Ljubljana, Slovenia, July 2010.
 55. “Topological Defects in Liquid Crystals”, 2nd School of the Italian Liquid Crystal Society, Erice, Italy, July 2011.
 56. “Topology and Geometry of Materials”, Topological Methods in Complex Systems, Institute for Mathematics and its Applications (IMA) Participating Institutions Graduate Students Summer Program, Philadelphia, July-August 2011.
 57. “Smectics!”, 8th Liquid Matter Conference, Vienna, Austria, September 2011.
 58. “Layered Liquid Crystals”, Geometry of Interfaces, Primosten, Croatia, October 2011.
 59. “Constructing Smectics”, Frontiers in Soft Matter, University of Colorado, Boulder, May 2012.
 60. “Constructing Layers”, Polymer Gordon Conference, July 2012.
 61. “The Plane Truth”, Modern Perspectives on Thin Sheets: Geometry, Elasticity, and Statistical Physics, Lorentz Center, Leiden, The Netherlands, September 2012.

Recent Colloquia

Case Western Reserve (April 2012), Georgia Tech (March 2012), Johns Hopkins University (February 2012), Carnegie Mellon University (March 2011), University of Pennsylvania - Math (November 2010), Brandeis University (April 2010), Los Alamos National Laboratory (March 2010), University of Bristol (October 2009), Villanova University (February 2009), University of Illinois, Urbana-Champaign (August 2008), University of Massachusetts, Amherst (April 2008), Temple University (October 2007), Northwestern University (November 2006), University of Toronto (November 2006).

Recent Seminars

University of Chicago (November 2011), Cambridge University (June 2011), Harvard Uni-

versity (March 2011), University of Pennsylvania (September 2010), Laboratoire de Physique des Solides Orsay (July 2010), Institute for Advanced Study (November 2009), University of Bristol (October 2009), Leiden University (April 2009), University of Illinois, Urbana-Champaign (August 2008), Kent State University (October 2007), University of Colorado (July 2007), Yale University (December 2006), Harvard University (December 2006).

Current Support

1. National Science Foundation Grant, *Bending, Twisting and Packing: Geometry and Soft Materials*, 2006–2012. DMR05-47230
2. National Science Foundation Grant (Co-PI; PI Shu Yang), *From a Single Micropatterned Elastic Membrane to a Library of Complex Patterns of Nanostructures: an Efficient Nanomanufacturing Route via Harnessing of Elastic Instability*, 2009–2012. CMMI09-00468
3. University of Pennsylvania MRSEC Grant, National Science Foundation, 2011–2017 (Co-Leader of IRG1). DMR11-20901

Past Support

- University of Pennsylvania MRSEC Grant, National Science Foundation, 2005–2011.
- Petroleum Research Fund Type AC Grant, American Chemical Society, *Bending the Rules* 2005–2007.
- University of Pennsylvania Research Foundation, *Materials Geometry: The Use of Modern Geometry in Real Materials*, 2006.
- National Science Foundation Grant, *Cells and Boundaries All Around Us*, 2002–2005.
- Nanoscience Interdisciplinary Research Team (NIRT) Grant, National Science Foundation, *Single Molecule Functional Nanostructures*, 2001–2005.
- University of Pennsylvania Research Foundation, *Novel Spherical Phases of Diblock Copolymers*, 2003.
- Petroleum Research Fund Type AC Grant, American Chemical Society, *Soap Froths and the Rational Design of Molecular Crystals*, 2001–2003.
- National Science Foundation International Grant (with CNRS), *Structure of Smectic Blue Phases*, 2000–2003.
- Drug Delivery Team, Southeastern Pennsylvania Nanotechnology Institute, 2001–2006.
- University of Pennsylvania Research Foundation, *Soap Froths and the Rational Design of Molecular Crystals*, 2001.
- Fellowship, Alfred P. Sloan Foundation, 1999–2001.
- University of Pennsylvania MRSEC Grant, National Science Foundation, 1998–2001.
- Faculty Early Career Development (CAREER) Award, National Science Foundation, *Chiral Molecules, Structures and Materials*, 1998–2002.
- Research Innovation Award, Research Corporation, *Entanglement Hydrodynamics of Polymer Nematics*, 1998–2000.
- Petroleum Research Fund Type G Grant, American Chemical Society, *Dynamics of Polymer Nematics*, 1998–2000.

Selected Professional Activities

- Fellowship Committee, Division of Polymer Physics, APS, 2010–2011.
- Member, KITP Advisory Board, 2009–2012.
- Scientific Committee, 23rd International Liquid Crystal Conference, Kraków, Poland 2010.
- Co-Organizer, Journal Club for Condensed Matter Physics, 2009 – 2011.

- Discussant, *Students Lunch with the Experts*, 2009 and 2005 March Meeting of the American Physical Society.
- Nominating Committee and Public Lecture Committee, Aspen Center for Physics 2009.
- Selection Committee for the Lars Onsager Prize of the American Physical Society, 2008–2009.
- Summer Program Committee, Aspen Center for Physics 2006–2009 (Chair 2007 and 2008)
- Chair of Nominating Committee, Division of Condensed Matter Physics (DCMP), American Physical Society, 2006 – 2009.
- Scientific Committee, *Curvature and Variational Modelling in Physics and Biophysics*, Santiago de Compostela, Spain (2007).
- Winter 2007 and Winter 2008 Program Committee, Aspen Center for Physics.
- Corresponding Member, Journal Club for Condensed Matter Physics, 2005 –
- External Review Committee, Chemical Physics Interdisciplinary Program, Kent State University, April 2005.
- Participant, National Science Foundation Workshop on *Opportunities in Materials Theory*, October 2004.
- General Member, Aspen Center for Physics, 2004–2009.
- Participant, National Science Foundation Workshop on the *Role of Theory in Biological Physics and Materials*, May 2004.
- Member, Board of Directors, Boulder School for Condensed Matter and Materials Physics, 2004 –
- Fellowship Committee, Group on Statistical and Nonlinear Physics, 2003.
- Editorial Board, *Electronic Liquid Crystal Communications*, March 2002 –
- Program Committee, Group on Statistical and Nonlinear Physics, March 2002.
- Member-at-Large, Executive Committee of the American Physical Society Topical Group on Statistical and Nonlinear Physics (GSNP), March 2001 – 2004
- Editorial Board, *Liquid Crystals Today*, 2000 –
- Lecturer, University of Pennsylvania Summer Science Academy, 1998, 2000, 2003, 2004, 2006, 2011.

Conferences and Schools Organized

- Chair, 2013 Gordon Research Conference on Liquid Crystals (Vice-Chair 2011).
- Co-Organizer, *Knotted Fields*, Kavli Institute for Theoretical Physics, June 2012.
- Co-Organizer, *Materials and the Imagination*, Aspen Center for Physics, January 2011.
- Co-organizer, *Geometry and Materials Physics: Making the Connection*, Aspen Center for Physics, June 2004.
- Co-organizer, *2002 Boulder School for Condensed Matter and Materials Physics*, July 2002.
- Co-organizer, *Symposium in Honor of the 65th Birthday of A. Brooks Harris*, University of Pennsylvania, 17-18 March 2000.
- Co-organizer, *3rd and 4th Annual Symposia on the Physics of Soft Materials*, Laboratory for Research on the Structure of Matter, University of Pennsylvania, 2 May 1998 and 9 October 1999.
- Co-organizer, *Ten Years of the TGB Phase: A Workshop*, University of Pennsylvania, 22-24 April 1998.