# Alexander J. Levine

University of California, Los Angeles Department of Chemistry & Biochemistry 3044A Young Hall 607 Charles E. Young Dr., East Los Angeles, CA 90095 **Education** 

1989–1996	. University of California, Los Angeles. Department of Physics, <b>Doctorate in Physics</b> (Ph.D.), thesis entitled <i>The Statistical Mechanics of Sedimentation</i> .
1989–1990	. University of California, Los Angeles. Department of Physics, Master of Science in Physics (M Sc.).
1985–1989	. University of California, Los Angeles. Bachelor of Science in Physics and Bachelor of Science in Mathematics. (Summa cum laude GPA: 3.95/4.00)

## Employment\_\_\_\_\_

July 2011 – PresentCenter for Biological Physics, University of California, Los Angeles, Director.
January 2012 – Present University of California, Los Angeles, <b>Professor.</b>
July 2008 – June 2011University of California, Los Angeles, Associate Professor.
July 2005 – July 2008 University of California, Los Angeles, Assistant Professor.
Sept. $2002 - July 2005 \dots$ . University of Massachusetts, Amherst, Assistant Professor.
2001– Aug. 2002 University of California, Santa Barbara, Postdoctoral Researcher.
1998–2001University of Pennsylvania, Postdoctoral Fellow.
1996–1998Corporate Research Science Laboratories, Exxon Research and Engineering Com- pany, Postdoctoral Fellow.
June 1995–Sept. 1995 Lucent Technologies / AT&T Bell Labs, Research Assistant.
Sept. 1994–June 1995 University of California, Los Angeles, Professional Development Program, UCLA Department of Physics, Instructor
June 1994–Sept. 1994 AT&T Bell Laboratories, Research Assistant.
1986–1988University of California, Los Angeles, Department of Astronomy, Research Assistant.
1984–1986University of California, Brain Research Institute, Lab Assistant.

## Awards and Fellowships\_

1993–1996 AT&T Graduate Fellowship	
1989 $\Phi$ BK Scholarship	
1989Julian Schwinger Graduate Fellowship	
1988 Election to Mathematics Honors Society	
1988 Election to $\Phi BK$	
1987 Joined Physics Honors Society $\Sigma\Pi\Sigma$	

1985 ..... Extension of Alumni Fellowship for a second year Freshman Honors Society Golden Key Honors Society Alumni Scholarship University of California Four Year Regents Scholarship University of California

Publication List\_

#### Articles in Preparation

- 1. Andrew R. Missel, William S. Klug, and Alex J. Levine *The nonlinear mechanics of semiflexible networks* **INVITED** for Nonlinearity (2012).
- 2. Alex J. Levine and C. F. Schmidt Microrheology INVITED for Reports on Progress in Physics.

#### Submitted

- 3. Arthur A. Evans and Alex J. Levine, *High energy deformation of filaments with internal structure and localized torque-induced melting of DNA*, Submitted to Physical Review E (2012).
- 4. Roie Shlomovitz, Thomas Boatwright, Michael Dennin, and Alex J. Levine, *Probing interfacial dynamics* and mechanics using submerged particle microrheology I: Theory, Submitted to Physics of Fluid (2012).
- 5. Thomas Boatwright, Michael Dennin, Roie Shlomovitz, and Alex J. Levine, *Probing interfacial dynamics and mechanics using submerged particle microrheology I: Experiment*, Submitted to Physics of Fluid (2012).
- 6. Jonathan Landy and Alex J. Levine, Dynamics of driven filaments subject to hydrodynamic interactions Submitted to Physical Review E (2012).
- 7. Robijn F. Bruinsma and Alex J. Levine Force fluctuations and energy landscapes in dynamic force spectroscopy Submitted to Proceedings of the National Academy of Sciences (2011).
- 8. R. Wang, Z. Wang, L. Millet, M. U. Gillette, A.J. Levine, and G. Popescu, *Spatiotemporal distribution of mass transport in living cells*, Submitted to Physical Review Letters (2012).
- 9. Jeremy D. Schmit and Alex J. Levine Intermolecular adhesion in semiconducting polymers, Submitted to Physical Review E. (2011).

#### Published

- 10. M. Ghorbani, M. Mehta, R. Bruinsma, and A.J. Levine, Nonlinear-dynamics theory of up-down transitions in neocortical neural networks Physical Review E 85, 021908 (2012).
- R. Wang, Z. Wang, J. Leigh, N. Sobh, L. Millet, M.U. Gillette, A.J. Levine, and G. Popescu, Onedimensional deterministic transport in neurons measured by dispersion-relation phase spectroscopy, J. Phys. Cond. Mat. 23, 374107 (2011).
- 12. R. Wang, Z. Wang, L. Millet, M.U. Gillette, A.J. Levine, and G. Popescu, *Dispersion-relation phase spectroscopy of intracellular transport* Opt. Express **19**, 20571-20579 (2011).
- Thomas Boatwright, Alex J. Levine, and M. Dennin Mechanical reorganization of cross-linked F-actin networks at the air-buffer interface, INVITED for Soft Matter, "Dynamics and Rheology of Fluid Interfaces" Issue. (2011).
- 14. YongKeun Park, Catherine A. Best, Tatiana Kuriabova, Mark L. Henle, Michael S. Feld, Alex J. Levine, and Gabriel Popescu *Measurement of the nonlinear elasticity of red blood cell membranes* Physical Review E 83 051925 (2011).
- 15. Mo Bai, Andrew R. Missel, Alex J. Levine, and William S. Klug, On the role of the filament length distribution in the mechanics of semiflexible networks, Acta Biomaterialia 7, 2109-2118 (2011).

- 16. Mo Bai, Andrew R. Missel, William S. Klug, and Alex J. Levine, *The mechanics and affine-nonaffine transition in polydisperse semiflexible networks*, Soft Matter 7, 907-914 (2011).
- 17. David Schwab, Robijn F. Bruinsma, Jack L. Feldman, and Alex J. Levine, *Rhythmogenic neuronal networks*, emergent leaders, and k-cores Physical Review E 82, 051911 (2010).
- Andrew R. Missel, Mo Bai, William S. Klug, and Alex J. Levine Affine-nonaffine transition in networks of nematically ordered semiflexible polymers Physical Review E 82, 041907 (2010).
- Thomas Boatwright, Alex J. Levine, and Michael Dennin Tracking giant folds in a monolayer Langmuir 26, 12755 (2010).
- Hao Qu, Chiao-Yu Tseng, Yong Wang, Giovanni Zocchi, and Alex J. Levine The elastic energy of sharply bent nicked DNA Europhysics Letters 90, 18003 (2010).
- YongKeun Park, Catherine Best-Popescu, Kamran Badizadegan, Ramachandra R. Dasari, Michael S. Feld, Tatiana Kuriabova, Mark L. Henle, Alex J. Levine, and Gabriel Popescu, *Measurement of red blood cell* mechanics during morphological changes, Proceedings of the National Academy of Sciences USA 107, 6731 (2010).
- 22. Mark L. Henle and Alex J. Levine Hydrodynamics in curved membranes: The effect of geometry on particulate mobility, Physical Review E 81, 011905 (2010).
- Chiao-Yu Tseng, Andrew Wang, Giovanni Zocchi, Biljana Rolih, and Alex J. Levine, The elastic energy of protein-DNA chimeras, Physical Review E 80, 061912 (2009).
- J.R. Rothenbuhler, J.-R. Huang, B.A. DiDonna, A.J. Levine and T.G. Mason, *Diffusion-limited aggregation of colloidal rods and disks*, Soft Matter 5, 3639-3645 (2009).
- Mark L. Henle and Alex J. Levine, Effective Viscosity of a Dilute Suspension of Membrane-bound Inclusions, Physics of Fluids 21, 033106 (2009).
- Alex J. Levine and F.C. MacKintosh, *The Mechanics and Fluctuation Spectrum of Active Gels*, Journal of Physical Chemistry B **113**, 3820-3830 (2009). P.-G. de Gennes memorial issue.
- 27. Robert Brewster, Gary S. Grest, and Alex J. Levine *Effects of cohesion on the surface angle and velocity* profiles of granular material in a rotating drum, Physical Review E **79**, 011305 (2009).
- Mark L. Henle, R. McGorty, A.B. Schofield, A.D. Dinsmore, and A.J. Levine The effect of curvature and topology on membrane hydrodynamics, Europhysics Letters 84, 48001 (2008).
- 29. Moumita Das, Alex J. Levine, and F.C. MacKintosh, *Buckling and force propagation along intracellular microtubules*, Europhysics Letters **84**, 18003 (2008).
- Robert Brewster, Leonardo Silbert, Gary S. Grest, and Alex J. Levine Relationship between interparticle contact lifetimes and rheology in gravity-driven granular flows, Physical Review E 77, 061302 (2008).
- 31. Jeremy D. Schmit and Alex J. Levine Statistical model for Intermolecular Adhesion in  $\pi$ -conjugated polymers, Physical Review Letters **100**, 198303 (2008).
- Tatiana Kuribova and Alex J. Levine, Nanorheology of viscoelastic shells: Applications to viral capsids, Physical Review E 77, 031921 (2008).
- 33. Robert Walder, Alex J. Levine, and Michael Dennin, *Rheology of two-dimensional F-actin networks associated with a lipid interface*, Physical Review E 77, 011909 (2008).
- F. C. MacKintosh and Alex J. Levine, Non-equilibrium mechanics and dynamics of motor-activated gels, Physical Review Letters 100, 018104 (2008).
- 35. Ali Naji, Alex J. Levine, and P.A. Pincus, *Corrections to the Saffman-Delbrück mobility for membrane bound proteins*, Biophysical Journal: Biophysical Letters **93**, L49-L51 (2007).

- Leonardo Silbert, Gary S. Grest, Robert Brewster, and Alex J. Levine Rheology and Contact Lifetimes in Dense Granular Flows, Physical Review Letters 99, 068002 (2007).
- 37. Moumita Das, F.C. MacKintosh, and Alex J. Levine *Effective medium theory of semiflexible filamentous networks*, Physical Review Letters **99**, 038101 (2007).
- M.L. Henle and Alex J. Levine, Erratum: Capillary wave dynamics on supported viscoelastic films: Single and double layers, Physical Review E 75, 059909(E) (2007).
- B.A. DiDonna and Alex J. Levine Unfolding cross-linkers as rheology regulators in F-actin networks, Physical Review E 75, 041909 (2007).
- Mark L. Henle and Alex J. Levine Capillary wave dynamics on supported viscoelastic films: Single and double layers, Physical Review E 75, 021604 (2007).
- J.R. Savage, D. Blair, A.J. Levine, R.A. Guyer, and A.D. Dinsmore Imaging the Sublimation Dynamics of Colloidal Crystallites Science 314(5800), pp. 795-798 (2006).
- Buddhapriya Chakrabarti and Alex J. Levine The nonlinear elasticity of an α-helical polypeptide: Monte Carlo studies Physical Review E 74, 031903 (2006).
- B.A. DiDonna and Alex J. Levine Filamin cross-linked semiflexible networks: Fragility under strain Physical Review Letters 97, 068104 (2006).
- 44. M. Atakhorrami, J.I. Sulkowska, K.M. Addas, G.H. Koenderink, J.X. Tang, A.J. Levine, F.C. MacKintosh, and C.F. Schmidt Correlated fluctuations of microparticles in viscoelastic solutions: Quantitative measurement of material properties by microrheology in the presence of optical traps, Physical Review E 73, 061501 (2006).
- 45. R. Brewster, J. Landry, G.S. Grest, and A.J. Levine *Breakdown of Bagnold scaling in cohesive granular* flows, Physical Review E **72**, 061301 (2005).
- David A. Head, Alex J. Levine, and F.C. MacKintosh Mechanical response of semiflexible networks to localized perturbations. Physical Review E 72, 061914 (2005).
- Jeremy D. Schmit and Alex J. Levine Intermolecular adhesion in conducting polymers Physical Review E 71, 051802 (2005).
- Buddhapriya Chakrabarti and Alex J. Levine The nonlinear elasticity of an α-helical polypeptide Physical Review E 71, 031905 (2004).
- 49. Alex J. Levine, David A. Head, and F.C. MacKintosh *The elasticity of semiflexible networks*, Proceedings of the XIV<sup>th</sup> Congress on Rheology. ed. The Korean Society of Rheology (2004).
- 50. Alex J. Levine, David A. Head, and F.C. MacKintosh *The Deformation Field in Semiflexible Networks*, Journal of Physics, Condensed Matter **16**, S2079 (2004).
- 51. Alex J. Levine, T.B. Liverpool, and F.C. MacKintosh Dynamics of rigid and flexible extended bodies in viscous films and membranes, Physical Review Letters **93**, 038102 (2004).
- Alex J. Levine, T.B. Liverpool, and F.C. MacKintosh The mobility of extended bodies in viscous films and membranes, Physical Review E 69, 021503 (2004).
- 53. David A. Head, Alex J. Levine, and F.C. MacKintosh Distinct regimes of elastic response and deformation modes of cross-linked cytoskeletal and semiflexible polymer networks, Physical Review E 68, 061907 (2003).
- 54. David A. Head, F.C. MacKintosh, and Alex J. Levine Non-universality of elastic exponents in random bond-bending networks. Physical Review E 68, 025101 (R) (2003).
- David A. Head, Alex J. Levine, and F.C. MacKintosh Deformation of cross-linked semiflexible polymer networks, Physical Review Letters 91, 108102 (2003).

- Victor Breedveld and Alex J. Levine Shear induced diffusion in dilute suspensions of charged colloids, Soft Materials 1, 235-244 (2003).
- D.T. Chen, E.R. Weeks, J.C. Crocker, M.F. Islam, R. Verma, J. Gruber, A.J. Levine, T.C. Lubensky, and A.G. Yodh *Rheological Microscopy:Local Mechanical Properties from Microrheology*, Physical Review Letters 90, 108301 (2003).
- Alex J. Levine and F.C. MacKintosh Dynamics of viscoelastic membranes, Physical Review E 66, 061606 (2002).
- Deniz Ertaş, Thomas C. Halsey, Alex J. Levine, and Thomas G. Mason, Stability of monomer-dimer piles, Physical Review E 66, 051307 (2002).
- 60. K.M. Addas, J.X. Tang, A.J. Levine, and C.F. Schmidt *Extracting local and bulk viscoelasticity of entangled FD virus solutions by two-bead microrheology*, Biophysical Journal **82** (1) 2432 (2002).
- Karim M. Addas, Alex J. Levine, Jay X. Tang, and Christoph F. Schmidt One- and Two-Particle Microrheology in Entangled Solutions of fd Virus, Physical Characterization of Biological Materials and Systems Symposium. Boston, MA USA 26 Nov. – 30 Nov. 2001. Warrendale, PA, USA Materials Research Society, (2002).
- Alex J. Levine and T.C. Lubensky Two-point microrheology and the electrostatic analogy, Physical Review E 65, 011501 (2001).
- R. Bruinsma, F. Rondelez, and A. Levine Flow-Controlled Island Growth in Langmuir Monolayers, European Physics Journal E 6, 191 (2001).
- Alex J. Levine and T.C. Lubensky The response function of a sphere in a viscoelastic two-fluid medium, Physical Review E, 63, 041510-1 (2001).
- Alex J. Levine and T.C. Lubensky One- and two-particle microrheology, Physical Review Letters 85, 1774 (2000).
- Randall D. Kamien and Alex J. Levine Boundary Effects in Chiral Polymer Hexatics, Physical Review Letters 84, 3109 (2000).
- T. G. Mason, A. J. Levine, D. Ertaş, and T. C. Halsey The Critical Angle of Wet Sand Piles, Physical Review E 60, R5044 (1999)
- 68. A. Levine, S. Ramaswamy, E. Frey, and R. Bruinsma "Hydrodynamic Screening in Stokesian Fluidized Beds" in *Structure and Dynamics of Materials in the Mesoscopic Domain* (Prox. 4<sup>th</sup> Royal Society–Unilever Indo-UK Forum in Materials Science and Engineering), Eds. Moti Lal, R.A. Mashelkar, B.D. Kulkarni, V.M. Naik (Imperial College Press and The Royal Society, 1999) pp. 195–206.
- 69. Amy B. Herhold, Deniz Ertaş, Alex J. Levine, and Hubert E. King Jr. Impurity mediated nucleation in hexadecane-in-water emulsions., Physical Review E 59, 6946 (1999).
- Amy B. Herhold, Deniz Ertaş, Alex J. Levine, and Hubert E. King Jr. Impurity induced slowing of nucleation in emulsified liquids in Dynamics in Small Confining Systems IV Symposium, Boston, MA USA 30 Nov. – 3 Dec. 1998. Warrendale, PA, USA: Materials Research Society, pp.85–96 (1999).
- Alex Levine, Sriram Ramaswamy, Erwin Frey, and Robijn Bruinsma, Screened and Unscreened Phases in Sedimenting Suspensions, Physical Review Letters 80, 5944 (1998).
- Alex J. Levine and Scott T. Milner, Star Polymers and the Failure of Time-Temperature Superposition, Macromolecules 31 (24) 8623 – 8637 (1998).
- 73. Alex J. Levine and Thomas C. Halsey, How Sandcastles Fall, Physical Review Letters 80, 3141 (1998)
- Martin-D. Lacasse, Gary S. Grest, and Alex J. Levine, Capillary-wave and chain-length effects at polymer/polymer interfaces, Physical Review Letters 80, 309 (1998).

- 75. S. N. Coppersmith, T. C. Jones, L. P. Kadanoff, A. Levine, J. P. McCarten, S. R. Nagel, S. C. Venkataramani, and Xinlei Wu, *Self-Organized Short-Term Memories*, Physical Review Letters **78**, 3983 (1997).
- 76. Shechao Feng, Alex Levine, and Lan Yin, Suppression of the Josephson Effect and Little-Parks Oscillations in the Quantum Hall Effect, in <u>Coulomb and Interference Effects in Small Electronic Structures</u> ed. D. C Glattli, M. Sanquer, and J. Tran Thanh Van, Éditions Frontières (1994).
- 77. Shechao Feng, Alex Levine, and Lan Yin, Suppression of the Josephson Effect by Quantum Fluctuations in the Fractional Quantum Hall State, Physical Review B. 50, 11045 (1994).

#### Teaching \_\_\_\_\_

- UCLA: Chemistry 221: Graduate Mathematical Methods for Chemistry Fall 2010
- UCLA: Chemistry 215B: Graduate Quantum Mechanics Part B Winter 2010
- UCLA: Chemistry 221: Mathematical Methods for Chemistry Fall 2009
- UCLA: Chemistry 215A: Graduate Quantum Mechanics Part A Fall 2009
- UCLA: Chemistry 215B: Graduate Quantum Mechanics Part B Winter 2009
- UCLA: Chemistry 215A: Graduate Quantum Mechanics Part A Fall 2008
- UCLA: Chemistry 215C: Graduate Quantum Mechanics Part C Spring 2008
- UCLA: Chemistry 223B: Graduate Statistical Mechanics Part B Winter 2008
- UCLA: Chemistry 223A: Graduate Statistical Mechanics Part A Fall 2007
- UCLA: Chemistry 228: Physical Chemistry Seminar Series Spring 2007
- UCLA: Chemistry 110A: Thermodynamics Winter 2007
- UCLA: Chemistry 110A: Thermodynamics Fall 2006
- UCLA: Chemistry 223B: Graduate Statistical Mechanics Part B, Winter 2006.
- UCLA: Chemistry 223A: Graduate Statistical Mechanics Part A, Fall 2005.
- UMASS: Graduate Biological Physics, Spring 2004.
- UMASS: Freshman Physics Colloquium: "Proteins: Your own Nanomachines," Fall 2004.
- UMASS: Honors Freshman Mechanics, Spring 2003.
- UMASS: Freshman Mechanics, Spring 2003.
- UMASS: Freshman Physics Colloquium: "Viruses and Self-Assembly," Fall 2003.
- UMASS: Soft Condensed Matter Physics: Independent Study, Spring 2003.
- UMASS: Graduate Classical Mechanics Fall 2002, Fall 2003, Fall 2004.
- UPENN: Introductory Electricity and Magnetism 06/15/2000 08/31/2000 Summer Session.

#### Committee Service

#### UCLA Department of Chemistry & Biochemistry

- 1. Physical Chemistry Division Graduate Advisor 2009-Present.
- 2. CNSI Theory Thrust Group Leader 2008–Present.
- 3. Curriculum Committee, Chair: 2008 Present.
- 4. Theory Search Committee, Chair: 2008 2009.
- 5. Legislative Assembly: 2005 2008.

#### University of Massachusetts, Amherst Department of Physics

- 1. Website Redesign Committee: 2002-2003
- 2. Gluckstern Professorship in Biological Physics Search Committee: 2003-2005.
- 3. Departmental Merit Review Committee: 2004-2005.

## $Research \ Students \_$

#### **Postdoctoral Researchers**

- Dr.Arthur Evans (2011-Present): Ph.D. 2010 UCSD, Supervisor: E. Lauga
- Dr. Roie Shlomovitz (2010-Present): Ph.D. 2010 Weizmann Institute of Science, Supervisor: Nir S. Gov.
- Dr. Andrew Missel (2009-Present): Ph.D. 2008 University of Illinois, Urbana-Champaign, Supervisor: Karin A. Dahmen.
- 4. Dr. Mark L. Henle (2005-2008): Ph.D. 2005 UCSB, Supervisor: Philip A. Pincus. (2008-Present) Carrier Fellow in Applied Mathematics, Harvard University.
- 5. Dr. Brian A. DiDonna (2006-2007): Ph.D. 2001 University of Chicago, Supervisor: Thomas Witten. (2001-2004) Postdoctoral Fellow at the University of Pennsylvania, Supervisor: Tom Lubensky. (2004-2006) Postdoctoral Fellow at Institute for Mathematics and its Applications, University of Minnesota, Supervisor: None.
- Dr. Moumita Das (2005-2007): Ph.D. 2004 Indian Institute of Science, Bangalore 2004. Supervisor: Sriram Ramaswamy (2004-2005) Postdoctoral Fellow at Harvard University, Supervisor: L. Mahadevan. (2006-Present) Postdoctoral Fellow at the Vrije Universiteit, Amsterdam.
- 7. Dr. Buddhapriya Chakrabarti (2003-2005):
  Ph.D. Indian Institute of Science, Bangalore 2002. Supervisor: Chandan Dasgupta.
  (2005-2007) Postdoctoral Fellow at Harvard University, Supervisor: David Nelson
  (2007-2008) Postdoctoral Researcher at UCLA, Supervisor: Tom Chou
  (2008-Present) Assistant Professor of Mathematics, Durham University, United Kingdom.

#### **Graduate Students**

1.	(2002-2005) Jeremy Schmit Current: Postdoctoral researcher at UCSF. Supervisor Ken Dill.	Graduate Student, UCSB Physics
2.	(2002-2007) Robert Brewster Current: Postdoctoral researcher Caltech. Supervisor Rob Phillips.	Graduate Student, UCLA Chemistry
3.	(2005-Present) Donald Blair	Graduate Student, UMASS Physics
4.	(2005-2008) Tatiana Kuriabova Current: Postdoctoral researcher, Department of Physics, University	Graduate Student, UCLA Physics of Colorado, Boulder.
5.	(2006-2008) David Schwab Current: Postdoctoral researcher, Department of Physics, Princeton	Graduate Student, UCLA Physics University
6.	(2007-Present) Rachael Harper	Graduate Student, UCLA Chemistry

7. (2008-Present) Jonathan Landy

8. (2009-Present) Christian Vaca

Graduate Student, UCLA Physics

Graduate Student, UCLA Chemistry

## **High School Students**

Crenshaw Gifted Magnet High School
Crenshaw Gifted Magnet High School
Summer Intern, Harvard Westlake High School
Summer Intern, Harvard Westlake High School

## Grants and Contracts \_

- **Pending** "IRG: Engineering Biological Recognition Properties on Surfaces and in Gels " CEMRI (Materials Research Centers and Teams) Pre-proposal: Approximately \$100,000/yr x 6yrs = \$600,000.
- **Pending** "NSF Physics Frontiers Center for Neuroscience: Emergent Dynamics of Ensembles of Neurons " NSF 10-560 (Physics Frontiers Centers) Pre-proposal: Approximately \$130,000/yr x 5yrs = \$650,000.
- **Pending** "Collaborative Research: Active membrane fluctuations and mass transport in living cells" NSF-PHY (Physics of Living Systems) [co-PI Levine]. \$144,000/yr x 3yrs = \$432,100.
- **Pending** "Erythrocyte Membrane Fluctuations as Functional Parameter for Clinical Blood Testing " NIH PAR-01-141 (Transforming biomedicine at the interface of the life and physical sciences) [Subcontractor: Levine]. 87,000/yrX4yrs = 348,500.
- Active "DNA springs coupled to proteins" NSF-DMR-1006162 [co-PI Levine with PI Giovanni Zocchi]. \$77,000/yr x 3yrs = \$231,500.
- Active "Collaborative Research: Mechanics and Microrheology of Biomimetic Materials" NSF-DMR-0907212 [PI Levine]. \$110,000/yr x 3yrs = \$330,000.
- Active "Micro- and Nano-mechanics of Active Biopolymer Networks" NSF-CMMI-0800533 [PI Levine]. \$100,000/yr x 3yrs = \$300,000.
- 2007-2008 "Workshop: The Frontiers of Microrheology" Institute for Complex Adaptive Matter (ICAM) (with co-I T.G. Mason) 04/01/2007 02/09/2008 \$30,000.
- 2007-2008 "Workshop: The Frontiers of Microrheology" International Institute for Complex Adaptive Matter (I2CAM) (with co-I T.G. Mason) 04/01/2007 – 02/09/2008 \$15,000.
- 2007-2008 "Workshop: The Frontiers of Microrheology" California Nanosystems Institute (CNSI) (with co-I T.G. Mason) 04/01/2007 - 02/09/2008 approx \$25,000.
- 2006-2007 "Deformation of an elastic membrane by a semiflexible network: Biomimetic approaches and aerospace applications" 05/01/2006 04/30/07. Lockheed Martin [PI: Levine], Total: \$75,000
- 2004-2007 "Mechanical Properties of Thin-Film Active Materials," NSF-INT/DMR-0354113 [co-I with Professor M. Dennin (UCI)] 09/01/2004 08/31/2007. Total: \$540,000; for Levine \$300,000.
- 2004-2006 "Gelation of Colloidal Particles on Droplet Surfaces: Dimension, Curvature, and Droplet Elasticity," NASA-NRA-02-OBPR-03-C [co-PI with Professor A.D. Dinsmore (UMASS)] 01/01/2005 12/31/2008. Original Award Totals: \$625,000; for Levine \$300,000. Later cut to approx \$150,000 for Levine.

## Invited Talks \_\_

- 1. Hydrodynamics and fluctuations on flat and curved membranes with applications to the microrheology of red blood cells, Department of Physics, Center for the Physics of Materials, McGill University, Montréal, QC, Canada. December 2010.
- 2. Hydrodynamics and fluctuations on flat and curved membranes with applications to the microrheology of red blood cells, Colloquium at the Department of Physics, University Southern California. November 2010.

- 3. Cell Quakes: Microrheology in active gels and living cells, Department of Mechanical Engineering, University of California at Santa Barbara. October 2010.
- 4. A theory of dynamic force spectroscopy applied to receptor ligand adhesion: Force fluctuations and multiple energy landscapes, Department of Materials, University of California at Santa Barbara. October 2010.
- 5. A theory of dynamic force spectroscopy applied to receptor ligand adhesion: Force fluctuations and multiple energy landscapes, Department of Chemistry, University of California at Riverside. October 2010.
- 6. A theory of dynamic force spectroscopy applied to receptor ligand adhesion: Force fluctuations and multiple energy landscapes, Department of Physics, University of Illinois at Urbana-Champaign. October 2010.
- 7. Cell Quakes: Microrheology in active gels and living cells, 6<sup>th</sup> World Congress on Biomechanics, Singapore. August 2010. unable to attend.
- 8. Sailing the Surfactant Sea: Membrane hydrodynamics, geometry and red blood cells, Vrije Universiteit Amsterdam, The Netherlands. June 2010.
- 9. Cell Quakes: Microrheology in active gels and living cells, Annual Meeting of the Canadian Association of Physicists, Toronto, Canada. June 2010.
- 10. Keeping the beat: Rhythmogenesis in excitatory neuronal networks, Ecole Normale Supérieure, Paris France. June 2010.
- 11. Cell Quakes: Microrheology in active gels and living cells, Conference on Self-Assembly in Biology and Materials Science, Huatulco, Mexico June 2010. unable to attend.
- 12. Keeping the beat: Rhythmogenesis in excitatory neuronal networks, Department of Mathematics, Durham University, United Kingdom. May 2010.
- 13. Cell Quakes: Microrheology in active gels and living cells, Biophysical Sciences Institute, Durham University, United Kingdom. May 2010.
- 14. Mechanics of the very small: Some thoughts on the design of biological structures at the scale of microns and nanometers, Public Lecture at Collingwood College, Durham University, United Kingdom. May 2010.
- 15. Sailing the Surfactant Sea: Membrane hydrodynamics, geometry and red blood cells, Department of Physics, Leeds University, United Kingdom. May 2010.
- 16. Cell Quakes: Microrheology in active gels and living cells, The Annual Meeting of the American Physical Society. Portland, OR. March 2010.
- 17. Cell Quakes: Microrheology in active gels and living cells, The Courant Institute of Mathematical Sciences at New York University, NY. February 2010.
- 18. Sailing the Surfactant Sea: Membrane hydrodynamics, geometry and red blood cells, Beckman Institute, University of Illinois at Urbana-Champaign, IL. January 2010.
- 19. Cell Quakes: Microrheology in active gels and living cells, The Korean Institute of Advanced Study, South Korea. December 2009. unable to attend.
- Cell Quakes: Microrheology in active gels and living cells, American Physical Society meeting of the Division of Fluid Mechanics, Minneapolis, MN. November 2009.
- 21. Cell Quakes: Microrheology in active gels and living cells, AIChE National Meeting, Nashville, TN. November 2009.
- 22. Sailing the Surfactant Sea: Membrane hydrodynamics, geometry and red blood cells, Multiple Length Scales in Complex Fluids, Santa Fe, NM. October 2009.
- 23. Keeping the beat: Rhythmogenesis in excitatory neuronal networks, University of Ottawa, Department of Neuroscience Seminar. March 2009.

- 24. Cell Quakes: Microrheology in active gels and living cells, University of Ottawa, Department of Physics Colloquium. March 2009.
- 25. Cell Quakes: Microrheology in active gels and living cells, SIAM Conference, August 2008.
- 26. Cell Quakes: Microrheology in active gels and living cells, Conference on the Frontiers and Directions in Condensed Matter Physics, Indian Institute of Science, Bangalore India, August 2008. unable to attend.
- 27. Cell Quakes: Microrheology in active gels and living cells, Department of Physics, University of Illinois at Urbana-Champaign, April 2008.
- 28. Cell Quakes: Microrheology in active gels and living cells, Procter & Gamble Co., Cincinnati, OH April 2008.
- 29. *Microrheology of active polymer networks*, Annual Meeting of the American Physical Society, New Orleans LA., March 2008.
- 30. The mechanics of active polymer networks, Colloquium at the Department of Physics, University of North Carolina at Chapel Hill. NC., February 2008.
- Sailing the surfactant seas: Hydrodynamics in flat and curved membranes, Workshop on Dynamics in Biological and Soft Matter Systems at Argonne National Laboratory, Argonne IL., February 2008.
- The mechanics of active polymer networks, Ludwig Maximilians-Universität München, Germany, September 2007.
- Sailing the surfactant seas: Hydrodynamics in flat and curved membranes, Seminar at the Department of Physics, Arizona State University, Phoenix, AZ, May 2007.
- 34. Sailing the surfactant seas: Hydrodynamics in flat and curved membranes, Department of Mechanical Engineering, University of California, San Diego, CA, May 2007.
- 35. The mechanics of biopolymer networks, Structural and Solid Mechanics Seminar, Department of Mechanical Engineering, University of California, Los Angeles, CA, April 2007.
- 36. Sailing the surfactant seas: Hydrodynamics in flat and curved membranes, Center for Interdisciplinary Research in Fluid Mechanics, University of California, Santa Barbara, CA, April 2007.
- 37. Sailing the surfactant seas: Hydrodynamics of rigid and flexible bodies in membrane and Langmuir monolayers, Joint Materials/Solid Mechanics Seminar, Brown University, Providence, RI February 2007.
- 38. The elasticity of semiflexible networks: Implications for the cytoskeleton, Department of Chemistry, University of Nevada, Reno, NV February 2007.
- 39. The elasticity of semiflexible networks: Implications for the cytoskeleton, Department of Physics Colloquium, UC Riverside, CA,October 2006.
- 40. The elasticity of semiflexible networks: Implications for the cytoskeleton, Liquid Crystal Institute Colloquium, Kent State University, Kent, OH October 2006.
- 41. The elasticity of semiflexible networks: Implications for the cytoskeleton, Department of Chemical Engineering Colloquium, University of Florida, Gainesville September 2006.
- 42. The elasticity of semiflexible networks: Implications for the cytoskeleton, Department of Physics Colloquium, University of Colorado, Boulder August 2006.
- 43. Sailing the surfactant sea: Hydrodynamics in membranes and fluid/fluid interfaces, Condensed Matter Seminar Department of Physics, University of Colorado, Boulder August 2006.
- 44. The elasticity of semiflexible networks: Implications for the cytoskeleton, Ecole Supérieure de Physique et de Chimie Industrielles, Paris France April 2006.

- 45. Sailing the surfactant sea: Hydrodynamics in membranes and fluid/fluid interfaces, IPAM Workshop I: Membrane Protein Science and Engineering, UCLA, Los Angeles, CA, USA. March 2006.
- 46. The worm turns: The statistical mechanics of alpha-helical polypeptides, Seminar Biomathematics Department, University of California, Los Angeles March 2006.
- 47. Microrheology in polymer solutions: Depletion and the shell model, American Chemical Society, Washington D.C. August 2005.
- Sailing the surfactant sea: Hydrodynamics in membranes and fluid/fluid interfaces, Frontiers in Biomembranes, Benasque, Spain August 2005.
- 49. The elasticity of semiflexible networks: Implications for the cytoskeleton, Gordon Conference on Gels, Networks, and Elastomers, New London, NH July 2005.
- 50. The elasticity of semiflexible networks: Implications for the cytoskeleton, Seminar, UCLA Chemistry, January 2005.
- 51. The elasticity of semiflexible networks: Implications for the cytoskeleton, Colloquium, Arizona State University, Department of Physics February 2005.
- 52. The statistical mechanics of alpha-helical polypeptides, Beckman Institute, University of Illinois at Urbana-Champaign, October 2004.
- 53. The elasticity of semiflexible networks: Implications for the cytoskeleton, University of Washington, Department of Physics October 2004.
- 54. The statistical mechanics of alpha-helical polypeptides, National Central University, Taiwan August 2004.
- 55. Static and flowing wet sand: Dragging Mr. Bagnold through the mud, Academica Sinica, Taiwan July 2004.
- 56. Sailing the surfactant sea: Hydrodynamics in membranes and fluid/fluid interfaces, Academica Sinica, Taiwan July 2004.
- 57. Microrheology, Academica Sinica, Taiwan July 2004.
- 58. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks, National Central University, Taiwan July 2004.
- 59. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks, Clarke University Department of Physics April 2004.
- 60. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks March 2004 Meeting of the American Physical Society, Montreal Canada. March 2004.
- 61. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks February 2004 UCLA Department of Chemistry, Los Angeles, CA.
- 62. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks February 2004 Theory Division, Los Alamos National Laboratories, Los Alamos, NM.
- 63. The worm turns: The helix-coil transition on the worm-like chain January 2004 The Isaac Newton Institute for Mathematical Sciences, Cambridge University, Cambridge England.
- 64. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Department of Chemistry Seminar, Florida State University. November 21, 2003.
- Sailing the Surfactant Sea: Membrane Hydrodynamics and Interfacial Microrheology Department of Physics Colloquium, Brandeis University. November 18, 2003.
- Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Physics Department Seminar, Brown University. November 5, 2003.

- Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks New England Statistical Physics Meeting, Brandeis University. October 25, 2003.
- Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Physics Department Seminar, Harvard University. October 21, 2003.
- 69. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks New England Complex Fluids Workshop, Brandeis University. September 17, 2003.
- Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks ASTATPHYS-MEX-2003, Puerto Vallarta, Mexico. August 27, 2003.
- Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Lans en Vercors, Biophysics Jam Sessions. August 7, 2003.
- 72. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Sandia National Laboratories Seminar. July 17, 2003.
- Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Materials Research Laboratory, UCSB. July 2, 2003.
- 74. Affine vs. Nonaffine Deformations in Semiflexible Polymer Networks Associative Networks Meeting at Polymer Science, University of Massachusetts, Amherst sponsored by NSF-MRSEC. May 14, 2003.
- 75. Fluctuation Effects in Biology Electrical Engineering Department Seminar, University of Massachusetts, Amherst April 18, 2003.
- 76. Affine vs. Nonaffine Deformation in Semiflexible Networks MIT Applied Math Seminar, April 15, 2003.
- 77. The worm turns: The helix-coil worm-like chain as a model  $\alpha$ -helix Cal Tech Division of Applied Physics January 31, 2003.
- 78. The worm turns: The helix-coil worm-like chain as a model  $\alpha$ -helix Complex Systems Seminar, Vrije Universiteit Amsterdam November 5, 2002.
- 79. *Microrheology in two and three dimensions*, Colloquium at the Jožef Stefan Institute, Ljubljana, Slovenia. December 2001.
- 80. *Microrheology in two and three dimensions*, Colloquium at Technion, Israel Institute of Technology, Haifa, Israel. November 2001.
- 81. *Microrheology in two and three dimensions*, Seminar at The Weizmann Institute of Science, Rehovot, Israel. November 2001.
- Microrheology in two and three dimensions, UCLA Physics Department Condensed Matter Journal Club, Los Angeles, CA, USA. October 2001.
- 83. What is Being Measured in Microrheology Experiments?, Colloquium at Indiana University Physics Department, Bloomington, IN, USA. September 2001.
- 84. What is Being Measured in Microrheology Experiments?, Condensed Matter Seminar at University of California at Irvine, Irvine, CA, USA. June 2001.
- 85. What is Being Measured in Microrheology Experiments?, Theoretical Condensed Matter Seminar, Cambridge University, Cambridge, UK. April 2001.
- 86. What is Being Measured in Microrheology Experiments?, Dutch Royal Society, Amsterdam, NL. April 2001.
- 87. What is Being Measured in Microrheology Experiments?, Symposium on Soft Matter as a Nonlinear Science sponsored by CCCNS, CNLS, and UCI, Laguna Beach, CA. February 2001.

- 88. What is Being Measured in Microrheology Experiments?, LRSM Symposium on "The Interface on Between Biology & Materials Science", The University of Pennsylvania, PA, USA. November 2000,
- 89. What is Being Measured in Microrheology Experiments?, Virgina Tech University, Blacksburg, VA. October 2000.
- 90. What is Being Measured in Microrheology Experiments?, Polymer Science Forum Seminar, ExxonMobil Research & Engineering Co. July 2000,
- 91. What is Being Measured in Microrheology Experiments?, Seminar at Yale University, Department of Mechanical Engineering, New Haven, CT. June 2000.
- 92. What is Being Measured in Microrheology Experiments?, Complex Fluids Seminar at Princeton University, Princeton, NJ.May 2000.
- 93. What is Being Measured in Microrheology Experiments?, Condensed Matter Seminar at Brown University, Providence, RI. April 2000.
- Screened and Unscreened Phases in Sedimenting Suspensions, Physics Department Colloquium at Georgetown University, Washington DC. March 2000.
- 95. Sedimentation: Physics Far from Equilibrium, Physics Department Colloquium at the University of Western Ontario, London, Ontario, Canada. February 2000.
- 96. Sedimentation: Physics Far from Equilibrium, Physics Department Colloquium at the University of Missouri, Rolla, MO. February 2000.
- 97. Screened and Unscreened Phases in Sedimenting Suspensions, Meeting of the American Physical Society, Atlanta GA. March 1999.
- 98. Screened and Unscreened Phases in Sedimenting Suspensions, Institut für Theoretische Physik, Physik-Department der Technischen Universität München, D-85747 Garching, Germany. May 1997.
- 99. Screened and Unscreened Phases in Sedimenting Suspensions, Gordon Conference in Il Cicco Italy. May 1997.
- 100. Theory of Fluctuation-Enhancement in Sedimenting Colloids, Meeting of the American Physical Society, St. Louis, MO. March 1996.

#### Interviews given for popular and/or technical publications \_

- 1. Interview for APS News on active mechanics of cells. May 2010.
- 2. Interview for Microbe Magazine on active mechanics of cells. May 2010.
- 3. Interview for **BioPhotonics** on the analysis of red blood cell membrane fluctuations. June 2010.

#### Contributed Talks \_

- Nematic Elastomers and the Red Blood Cell, Meeting of the American Physical Society, Seattle, WA. March 2001.
- What is Being Measured in Microrheology Experiments?, Meeting of the American Physical Society, Minneapolis, MN. March 2000.
- Boundary Effects in Chiral Polymer Hexatics, Meeting of the American Physical Society, Minneapolis, MN. March 2000.
- How Sand Castles Fall: The Stability of Cohesive Sandpiles, Meeting of the American Physical Society, Los Angeles, CA. March 1998.

- Star Polymers and the Failure of Time-Temperature Superposition, Meeting of the American Physical Society, Los Angeles, CA. March 1998.
- Screened and Unscreened Phases in Sedimenting Suspensions, Meeting of the American Physical Society, Los Angeles, CA. March 1998.
- Bubble Flow Instabilities, Meeting of the American Physical Society, Kansas City, MO. March 1997.
- Non-Equilibrium Fluctuations in Sedimenting Suspensions: A Dynamical Renormalization Group Theory, Meeting of the American Physical Society, Kansas City, MO. March 1997.
- Sedimentation and the KPZ Equation, Meeting of the American Physical Society, San Jose, CA. March 1995.
- Sedimentation and the KPZ Equation with Colored Noise, Informal Theory Seminar at AT&T Bell Laboratories, September 1995.

### Meetings Organized\_

- Workshop Organizer for "Biomechanics 2012 Mechanics in biology from single molecules to tissues" at UCLA. January 4 to January 6, 2008.
- Workshop Organizer for "Frontiers of Microrheology" at UCLA. February 6 to February 9, 2008.
- Session Organizer for "Gordon Conference on Theoretical Biology and Biomathematics" June 2006.
- Program Organizer for the 19<sup>th</sup> New England Complex Fluids Workshop held at the University of Massachusetts, Amherst on 28, June 2004. co-Organiziers: Maria Santore (Polymer Science) and Anthony Dinsmore.
- Technical Program Organizer for "Local probes of rheology and structure" at the 73<sup>rd</sup> Annual Meeting of the Society of Rheology. Co-Organizer: Thomas Mason.

## Other Professional Activities\_

#### Activities and Memberships in Professional Societies

- Participant in site visit review of Nanoscale Science and Engineering Center at the University of Pennsylvania, *Molecular Function at the Nano/Bio Interface Center*, July 2010.
- (April 2007 **Present**) UCLA Representative on the Science Steering Committee (SSC) of the Institute for Complex Adaptive Matter (ICAM)
- (May 2004) Invited Participant for the Workshop on the Role of Theory in Biological Physics sponsored by the National Science Foundation (NSF).
- Member of the American Physical Society
- Member of the American Chemical Society
- Member of the Materials Research Society
- Member of the Society of Rheology

#### Session Chair at Conferences or Symposia

- Session Chair, The XVth International Congress on Rheology August 2008, Monterray, California (USA).
- Session Chair American Physical Society March Meeting 2007, Denver, CO. DFD: Monolayers, Membranes & Microemulsions
- Session Chair for "Gordon Conference on Theoretical Biology and Biomathematics" June 2006.
- Session Chair, The XIVth International Congress on Rheology August 2004, Seoul, Korea.
- Session Chair American Physical Society March Meeting 2000, Minneapolis, MN. DCMP: Colloids IV: Suspensions, Foams, and Sedimentation

#### Editor or Reviewer for Peer-reviewed Journals:

Editor of:

• (2009- Present) Journal of Biological Physics.

Reviewer for:

- Biophysical Journal
- European Journal of Physics
- Europhysics Letters
- Journal of Chemical Physics
- Journal of Fluid Mechanics
- Journal of Optics A: Pure and Applied Optics
- Journal of Physics A: Mathematical and Theoretical
- Journal of Theoretical Biology
- Physical Review E
- Review of editors for Physical Review E
- Physical Review Letters
- Macromolecules
- Nature Physics
- Rheologica Acta

#### **Reviewer for Funding Agencies:**

- Euryi International Awards 2006
- National Science Foundation
- Petroleum Research Foundation
- US Israel Binational Science Foundation

## References\_

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> Joyce Chair Professor of Chemical Engineering phone: (814) 863-9355 fax: (814) 865-7846 e-mail: stm9@psu.com

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Document Last Changed on April 20, 2012.