Xiaoyu Zheng

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Department of Mathematical Sciences
Kent State University
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PRESENT POSITION

Assistant professor, Kent State University, August 2006 - present

EDUCATION

Ph.D. in Applied Mathematics, May 2006
University of North Carolina at Chapel Hill, Chapel Hill, NC
Adviser: Professor M. Gregory Forest

M.S. in Mathematics, July 2001
Jilin University, Changchun, China

B.S. in Mathematics, July 1999
Jilin University, Changchun, China

RESEARCH INTERESTS

- Effective properties of nano-composites
- Homogenization & percolation methods
- Liquid Crystal Modeling

GRANTS

- NSF DMS-0807954, 07/01/2008-07/01/2011, PI
- NSF DMS-0821071 SCREMS, by 09/01/2009, CO-PI
- NSF DMS-0908470 SGER, 10/01/2009-10/01/2011, CO-PI

GRANTS SUBMITTED

- OBR, Photoinduced surface relief in liquid crystal elastomers: a paradigm for integrated LabView data acquisition and numerical modeling, Dec. 2008, CO-PI, Not funded.

PUBLICATIONS

1. **X. Zheng**, P. Palffy-Muhoray, *One order parameter tensor mean field theory for biaxial liquid crystals*, Discrete and Continuous Dynamical Systems-Series B, submitted (2009)
2. A. Haji-Akbari, M. Engel, A. S. Keys, **X. Zheng**, R. G. Petschek, P. Palffy-Muhoray, S. C. Glotzer, *Disordered, quasicrystalline and crystalline phases of densely packed tetrahedra*, Nature, **462**, 773-777 (2009)
3. **X. Zheng**, W. Iglesias, P. Palffy-Muhoray, *Distance of closest approach of two arbitrary hard ellipsoids*, Phys. Rev. E, **79**, 057702(2009)
4. **X. Zheng**, M. G. Forest, R. A. Vaia, M. Arlen, R. Zhou, *A strategy for dimensional percolation in sheared nanorod dispersions*, Advanced Mater., **19**(22), 4038-4043(2007)
5. **X. Zheng**, P. Palffy-Muhoray, *Eigenvalue decomposition for tensors of arbitrary rank*, Electronic Liquid Crystals (2007)
6. **X. Zheng**, P. Palffy-Muhoray, *Distance of closest approach of two arbitrary hard ellipses in 2D*, Phys. Rev. E, **75**, 061709 (2007)
7. **X. Zheng**, M. G. Forest, R. Lipton, R. Zhou, *Nematic polymer mechanics: flow-induced anisotropy*, Continuum Mechanics and Thermodynamics, **18**, 377-394 (2007)
8. M. G. Forest, **X. Zheng**, R. Zhou, Q. Wang, R. Lipton, *Anisotropy and dynamic ranges in electrical properties of sheared nematic polymer nano-composites*, Advanced Functional Materials, **15**(12), 2029-2035(2005) (Cover article)

9. **X. Zheng**, M. G. Forest, R. Lipton, R. Zhou, Q. Wang, *Exact scaling laws for electrical conductivity properties of nematic polymer nano-composite monodomains*, Advanced Functional Materials, **15**(4), 627-638 (2005)
10. M. G. Forest, R. Zhou, Q. Wang, **X. Zheng**, R. Lipton, *Anisotropy and heterogeneity of nematic polymer nano-composite film properties*, IMA volumes in Mathematics and its Applications, "Modeling of soft matter", **141**, 85-98 (2005)
11. H. Zhou, M. G. Forest, **X. Zheng**, Q. Wang, R. Lipton, *Extension-enhanced conductivity of liquid crystalline polymer nano-composites*, Macromolecular Symposia, **288**(1), 81-90 (2005)
12. **X. Zheng**, M. G. Forest, R. Zhou, Q. Wang, *Likelihood & expected-time statistics of monodomain attractors in sheared discotic and rod-like nematic polymers*, Rheologica Acta, **44**(3), 219-234 (2005)
13. H. Yuan, **X. Zheng**, *Existence and uniqueness for a quasilinear hyperbolic equation with σ-finite Borel measures as initial conditions*, Journal of Mathematical Analysis and Applications, **277**(1), 27–50 (2003)

INVITED TALKS

The distance of closest approach of two ellipsoids & the biaxial phase of nematic liquid crystals, University of Akron, Akron, OH, October 17, 2008

Effective property characterization of Nano-rod/Nano-platelet Composites, Tulane University, New Orleans, LA, April 25, 2008

Angular momentum transportation in anisotropic complex fluids, Workshop on ferroelectric phenomena in liquid crystals, Kent, OH, June 19-28, 2007

Effective Property Characterization of Nano-Composites from Homogenization and Percolation Theory
Liquid Crystal Institute, Kent State University, Kent, OH, October 4, 2006

On the effective properties of nematic polymer nano-composite
University of Colorado at Boulder, Boulder, CO, April 10, 2006
Kent State University, Kent, OH, February 27, 2006
University of Utah, Salt Lake City, UT, January 20, 2006

CONFERENCE TALKS

One order parameter tensor mean field theory for biaxial liquid crystals, APS March Meeting, Pittsburgh, PA, March 16-20, 2009

One order parameter tensor mean field theory for biaxial liquid crystals, SIAM Conference on Computational Science and Engineering, Miami, FL, March 2-6, 2009

Angular momentum transport in anisotropic complex fluids, SIAM Annual Meeting, San Diego, CA, July 7-11, 2008

Angular momentum transport in anisotropic complex fluids, APS March Meeting, New Orleans, LA, March 10-14, 2008

Transport properties of micro-structured media and composite materials, The 44th Annual Technical Meeting of the Society of Engineering Science, College Station, TX, October 21-24, 2007

Dimensional percolation & induced electrical conductivity of sheared nano-rod dispersions in a weakly conducting matrix, The 79th Society of Rheology Annual Meeting, Salt Lake City,

UT, Oct 9-11, 2007

Distance of closest approach of two hard ellipses, APS March Meeting, Denver, CO, March 5-9, 2007

Percolation thresholds and cluster statistics for quiescent and sheared rigid-rod dispersions, The 43rd Annual Technical Meeting of the Society of Engineering Science, University Park, PA, August 13-17, 2006

Effective Property Characterization of Nano-Composites From Homogenization and Percolation Theory, SIAM Annual Meeting, Boston, MA, July 10-14, 2006

Nano-composite material properties: homogenization over flow-induced orientational distributions, Southeast Atlantic Mathematical Sciences Workshop, Charleston, SC, September 14-17, 2004

Exact scaling laws for electrical conductivity properties of nematic polymer nano-composite monodomains, SIAM Annual Meeting, Portland, OR, July 12-16, 2004

Likelihood & expected-time statistics of monodomain attractors in sheared discotic and rod-like nematic polymers, AMS Sectional Meeting, Chapel Hill, NC, October 24-25, 2003

MEMBERSHIPS American Mathematical Society;
Society for Industrial and Applied Mathematics;
American Physical Society;
Society of Rheology