

# Xiaofeng Yang

Jan 26, 2011

## RESEARCH AREAS

Applied and Computational Mathematics, Mathematical modeling and scientific computing with applications to Soft Matter/Complex fluids. Numerical analysis of finite element methods and spectral methods.

## EDUCATION

- Ph.D., Mathematics, Purdue University, West Lafayette, Indiana, USA, 2007,
- MS, Mathematics, University of Science and Technology of China, China, 2001,
- BS, Mathematics, University of Science and Technology of China, China, 1998.

## PROFESSIONAL EMPLOYMENT

- 8/2009-present, **Assistant Professor at tenure track**, Department of Mathematics, University of South Carolina, Columbia, SC
- 7/2007-7/2009, **Postdoctoral Research Associate**, Department of Mathematics, University of North Carolina at Chapel Hill (UNC-CH). Chapel Hill, NC.
- 2001-2007, **Teaching assistant and Research assistant**, Department of Mathematics, Purdue University, West Lafayette, IN.

## PUBLICATIONS

- [1]. X. Yang, M. G. Forest, C. Liu and J. Shen, *Shell cell rupture of nematic droplets in a viscous fluid*, **J. Non-Newtonian Fluid Mech.**, *accepted*, 2010.
- [2]. K. Xu, M. G. Forest and X. Yang, *Shearing the I-N phase transition of liquid crystalline polymers: long-time memory of defect initial data*, **Disc. Conti. Dyn. Sys.-B**, 15:2, 457-474, 2010.
- [3]. J. Shen and X. Yang, "Energy stable schemes for Cahn-Hilliard phase-field model of two-phase incompressible flows", **Chinese Ann. Math. series B**, 31:743-758 (2010).
- [4]. J. Shen and X. Yang, "Numerical Approximations of Allen-Cahn and Cahn-Hilliard Equations", **Disc. Conti. Dyn. Sys.-A**, 28:1669-1691, 2010.
- [5]. M. G. Forest, S. Heidenreich, S. Hess, X. Yang and R. Zhou, *Dynamic texture scaling of sheared nematic polymers in the large Ericksen number limit*, **J. Non-Newtonian Fluid Mech.**, 165:687-697, 2010..

- [6]. J. Shen and X. Yang, *A Phase-field model for two-phase flows with large density ratio and its numerical approximation*, **SIAM J. Sci. Comput.**, 32(3):1159-1179, 2010.
- [7]. X. Yang, M. G. Forest, W. Mullins and Q. Wang, *2-D lid-driven cavity flow of nematic polymers: an unsteady sea of defects*, **Soft Matter**, 6:1138 – 1156, 2009.
- [8]. X. Yang, M. G. Forest, W. Mullins and Q. Wang, *Dynamic defect morphology and hydrodynamics of sheared nematic polymers in two space dimensions*, **J. Rheology**, 53(3): 589-615, 2009.
- [9]. X. Yang, M. G. Forest, W. Mullins and Q. Wang, *Quench sensitivity to defects and shear banding in nematic polymer film flows*, **J. Non-Newtonian Fluid Mech.**, 159:115–129, 2009.
- [10]. J. Shen and X. Yang, *An efficient moving mesh spectral method for the phase-field model of two-phase flows*, **J. Comput. Phys.**, 228: 2978–2992, 2009.
- [11]. X. Yang, *Error analysis of Stabilized Semi-implicit method of Allen-Cahn Equation*, **Disc. Conti. Dyn. Sys.-B**, 11(4):1057-1070, 2009.
- [12]. M. G. Forest, S. Heidenreich, S. Hess, X. Yang and R. Zhou, *Robustness of pulsating jet-like layers in sheared nano-rod dispersions*, **J. Non-Newtonian Fluid Mech.**, 155:130-145, 2008.
- [13]. X. Yang, Z. Cui, M. G. Forest, Q. Wang and J. Shen, *Dimensional Robustness & Instability of Sheared, Semi-Dilute, Nano-Rod Dispersions*, **SIAM Multi. Model. Simul.**, 7:622-654, 2008.
- [14]. J. L. Guermond, J. Shen and X. Yang, *Error analysis of fully discrete velocity-correction methods for incompressible flows*, **Math. Comp.**, 77:1387-1405, 2008.
- [15]. C. Liu, J. Shen and X. Yang, *Dynamics of defect motion in nematic liquid crystal flow: modeling and numerical simulation*, **Comm. Comput. Phys.**, 2:1184-1198, 2007.
- [16]. J. Shen and X. Yang, *Error estimates for finite element approximations of consistent splitting schemes for incompressible flows*, **Disc. Conti. Dyn. Sys.-B**, 8:663-676, 2007.
- [17]. X. Yang, J. J. Feng, C. Liu and J. Shen, *Numerical simulations of jet pinching-off and drop formation using an energetic variational phase-field method*, **J. Comput. Phys.**, 218:417-428, 2006.
- [18]. X. Yang, W. Yang and F. Chen, *Degree Reduction of Interval B-Spline Curves*, **J. of Chin. soft.**, 13:490-500, 2002.
- [19]. X. Yang and F. Chen, *Merging a pair of Interval Bezier Curves*, **Int. Conf. comp. Sci.**, 392-397, 2001.

## Grant

- **Pending:** NSF, DMS: Modeling and Computational Studies of Single- and Multi-phase complex fluids with rigid rod microstructure, PI. USC, \$96,425, 07/01/2011-06/30/2014.

- **Pending:** NSF/NIGMS, DMS: Collaborative Research: Cytoskeletal Oscillations: Mathematical Modeling Integrated with Experiments, co-PI. USC, \$375,000, 06/01/2011-05/31/2016.
- **Pending:** NSF/NIGMS, DMS: Modeling cell motion on topographically designed substrates, co-PI. USC, \$1,375,392, 06/01/2011-05/31/2016.
- Current: 2009-2012, Initiative Start-up grant of USC, principal investigator, total Award Amount: 50,000.00\$.
- Current : 2009-2012, Temperature control of flow-processing in Rigid-rod nano-composites, co-Principal Investigator, Army Research office of USA, total Award Amount: 225,000.00\$.

### **Attended Conferences, Invited talks and Posters**

- (Invited talk) NSF workshop on Mathematical Modeling and Computer Simulations, CO, Sep, 2010.
- (Invited seminar), Chinese Academy of Science, Institute of Software, Beijing, China, May, 20, 2010;
- (Invited talk), International Conference on "Advances in Partial Differential Equations and their Applications", Fudan University, Shanghai, China, Jun 2, 2010;
- (Invited seminar), Department of Mathematics, University of Science and Technology of China, Hefei, Anhui, China, June 5, 2010;
- (Invited seminar), Department of Mathematics, University of Suzhou, Suzhou, Jiangsu, China, July 5, 2010
- (Invited seminar), Department of Mathematics, South East University, Nanjing, Jiangsu, China, July 8, 2010
- (Invited seminar), Department of Mathematics, University of Hokkaido, Sapporo, Japan, July 16, 2010.
- (Poster) Transport and Mixing in Complex and Turbulent Flows, Institute for Mathematics and its applications and Department of Mathematics, University of Minnesota, MN, April, 2010.
- (Poster) Analysis and Computation of Incompressible Fluid Flow, Institute for Mathematics and its applications and Department of Mathematics, University of Minnesota, MN, Feb, 2010.
- (Invited talk) SIAM southeastern regional meeting, Columbia, SC, April, 2009.
- (Invited talk) Nonlinear IMACS conference, Athens, GA, March 2009.
- (Invited talk) Department of Mathematics, Drexel University, Philadelphia, PA, Feb, 2009.
- (Invited talk) Department of Mathematics, Temple University, Philadelphia, PA, Feb, 2009.
- (Invited talk) SIAM Conference on Computational Science and Engineering (CSE09).
- (Invited talk) Joint Mathematics Meeting, Washington D. C., Jan, 2009.

- International conference of Rheology, Monterey, CA, Aug. 2008.
- (Contributed talk) SIAM Annual Meeting, San Diego, CA, July, 2008.
- Ferroelectric phenomena in soft matter systems, American institute of mathematics, Palo Alto, CA, May, 2008.
- SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May, 2008.
- (Invited talk) SIAM Southeastern-Atlantic Section Conference, Orlando, FL, March, 2008.
- (Invited talk) Computing Research Institute Seminar, Purdue University, April, 2005.
- Ferroelectric phenomena in liquid crystals workshop, Liquid Crystal Institute and Department of Mathematical Sciences, Kent State University, June 2007.
- John H. Barrett Memorial Lectures, University of Tennessee, April, 2007.
- Mathematics of Materials and Macromolecules: Multiple Scales, Disorder, and Singularities, University of Minnesota, September 20, 2004-Sep. 24, 2004.
- International Conference on Spectral and High Order Methods. (ICOSAHOM-04), Brown University, Providence, RI. June 21, 2004- June 25, 2004.

### **Synergistic Activities**

- Maintain the regular weekly seminar of Applied and Computational Mathematics of Department of Mathematics of USC.
- Organized various workshops and minisymposium on soft matter and complex fluids at national and international meetings.
- Referee for many professional journals (e.g., SIAM Journal of Scientific Computing, SIAM Journal of Numerical Analysis, Mathematics of Computation, Journal of Computational Physics, Discrete and Continuous Dynamical System – Series B, etc.)

### **COLLABORATORS & OTHER AFFILIATIONS**

- Collaborators: Z. Cui, Fayetteville State U; M. Gregory Forest, UNC-CH; J. J. Feng, U of British Columbia; J. L. Guermond, Texas A&M U; S. Hess, Technische University Berlin; C. Liu, Penn State U; W. M. Mullins, UNC-CH; J. Shen, Purdue U; Qi Wang, U of South Carolina; Qian Wang, U of South Carolina; R. Zhou, Old Dominion U.
- Thesis Advisor: J. Shen, Purdue U.
- Postdoc Sponsor: M. Gregory Forest, UNC-CH
- Tentative Phd. Students: None

- Current Postdocs: None