Curriculum Vitae
Xuejin Li

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EDUCATION

June 2009 **Ph.D.** in Chemistry and Physics of Polymers
University of Science & Technology of China, P. R. China

July 2004 **B.Eng.** in Polymer Material and Engineering
B.Econ. in Financial Statistics (dual degree)
University of Science & Technology of China, P. R. China

RESEARCH EXPERIENCE

Jul 2017 - Associate Professor (Research), Division of Applied Mathemathics & Center for Fluid Mechanics, Turbulence and Computation, Brown University

Sept 2014 - Jun 2017 Assistant Professor (Research), Division of Applied Mathemathics, & Center for Fluid Mechanics, Turbulence and Computation, Brown University

Sept 2012 - Aug 2014 Postdoctoral Research Associate, Division of Applied Mathemathics Brown University

Jun 2009 - May 2012 Postdoctoral Research Associate, Department of Polymer Science & Engineering University of Science & Technology of China

RESEARCH INTERESTS

- Celluar mechanics
- Computational fluid dynamics
- Hematological disorders
- Microfluidics

HONORS, FELLOWSHIPS AND SCHOLARSHIPS

- The Recruitment Program for Young Professionals (known as *1000 Talents Program for Distinguished Young Scholars*) in 2018
- DOE ASCR Leadership Computing Challenge (ALCC) Award in 2017–2018
- Travel fund for *2013 NIMBioS Investigative Workshop on Modeling Blood Cell Interactions*
- Chinese Academy of Sciences (CAS) K. C. Wong Post-doctoral Fellowships in 2010
- Best Poster Award Winner at National Polymer Conference in 2009
- Chinese Academy of Sciences (CAS) Zhu-Li-Yuehua outstanding doctoral scholarship in 2009
- Outstanding post-graduate of University of Science and Technology of China in 2009
- Donggang post-graduate scholarship in academic year 2006-2007
- Excellent thesis award of University of Science and Technology of China in 2004

GRANTS AND AWARDS

7. 2018.07–2020.06 1000 Talents Program for Young Scholars, "Properties of biological cells and human diseases". Role: PI
6. 2018.07–2020.06 Research Start-up Funds of Zhejiang University ("Hundred Talents Program"), "Multiscale modeling of hematological disorders". Role: PI
5. 2017.07–2018.06 ASCR Leadership Computing Challenge (ALCC) Award (DOE), "Multiscale simulations of hematological disorders", 46,000,000 supercomputing processor hours. Role: Co-PI (PI: George Em Karniadakis)
4. 2011.01–2013.12 National Natural Science Foundation of China, "Flow-induced translocation of polymers through a fluidic channel". Role: PI
3. 2010.06–2012.05 Fundamental Research Funds for the Central Universities, "Dissipative particle dynamics simulations of shape transformations of polymeric vesicles under shear". Role: PI
2. 2010.01–2011.12 K. C. Wong Education Foundation, Hong Kong, "Effect of hydrodynamic interaction on the translocation of polymers through a narrow channel". Role: PI
1. 2009.07–2011.06 China Postdoctoral Science Foundation, "Numerical simulation of polymer/DNA translocation through a microfluidic channel". Role: PI

PUBLICATIONS AND IMPACT

- **Researcher ID:** B-8559-2009
- **Publications:** 38 papers in refereed journals, including PNAS (1), Biophys J (5), PLOS Comput Biol (3), Soft Matter (3), J Fluid Mech (1), Macromolecules (2), Nanoscale (2), Chem Commun (2), Philos Trans R Soc (1), Rheol Acta (1), J Biomech (1), J Biomech Eng (1), Polymer (2), J Chem Phys (4), J Phys Chem B (1), Phys Chem Chem Phys (2), Phys Biol (1), and Interface Focus (1).
- **H-index:** 18 (Google Scholar); 17 (ISI Web of Science)
- **Total number of citations:** $>$ 1020 (Google Scholar); $>$ 760 (ISI Web of Science)

REFERRED JOURNAL PUBLICATIONS (*indicates corresponding author; §contributed equally)

43. S. Z. Abidi§, **X. J. Li**§, D. P. Papageorgiou, A. Shah, G. J. Kato, J. Durr, G. E. Karniadakis, M. Dao*, and S. Suresh. "Effects of acute hypo-osmolarity on sickle cell biorheology". *JCI Insight* **2018**, *3*, to be submitted.
42. Y. Deng, D. P. Papageorgiou, H.-Y. Chang, S. Z. Abidi, H. Lei, **X. J. Li***, M. Dao, and G. E. Karniadakis*. "Quantifying shear-induced deformation and detachment of individual adherent red blood cells in sickle cell disease". *Soft Matter* **2018**, *14*, to be submitted.
41. H.-Y. Chang, A. Yazdani, **X. J. Li**, C. Mantzoros, and G. E. Karniadakis*. "Quantifying platelet margination in diabetic blood dlow". *Biophys. J.* **2018**, *115*, to be submitted.
40. D. P. Papageorgiou§, S. Z. Abidi§, H.-Y. Chang, **X. J. Li**, G. J. Kato, G. E. Karniadakis, M. Dao*, and S. Suresh*. "Simultaneous polymerization and adhesion under hypoxia in sickle cell anemia". *Proc. Natl. Acad. Sci. U.S.A.* **2018**, *116*, in revision.
39. H. Li§, L. Lu§, **X. J. Li**, P. Buffet, M. Dao*, G. E. Karniadakis*, and S. Suresh*. "Mechanics of diseased red blood cells in human spleen and consequences for hereditary blood disorders". *Proc. Natl. Acad. Sci. U.S.A.* **2018**, *116*, in revision.
38. L. P. Chen, **X. J. Li**, Y. Zhang, T. Chen, M. He, X. Yin, S. Y. Xiao*, and H. J. Liang*. "Morphological and mechanical determinants of cellular uptake of deformable nanoparticles". *Nanoscale* **2018**, to appear.

37. H.-Y. Chang, **X. J. Li**[*], and G. E. Karniadakis[*]. "Modeling of biomechanics and biorheology of red blood cells in type-2 diabetes mellitus". *Biophys. J.* **2017**, *113*, 481-490. (*BJ Highlighted Article*)
36. L. Lu, H. Li, X. Bian, **X. J. Li**, and G. E. Karniadakis[*]. "Mesoscopic adaptive resolution scheme toward understanding of interactions between sickle cell fibers". *Biophys. J.* **2017**, *113*, 48-59. (*Cover Article*)
35. **X. J. Li**, E. Du, M. Dao[*], S. Suresh, and G. E. Karniadakis[*]. "Patient-specific modeling of individual sickle cell behavior under transient hypoxia". *PLOS Comput. Biol.* **2017**, *13*, e1005426. (*Highlighted on Biophysical Society Blog*)
34. **X. J. Li**[*], M. Dao, G. Lykotrafitis, and G. E. Karniadakis[*]. "Biomechanics and biorheology of red blood cells in sickle cell anemia". *J. Biomech.* **2017**, *50*, 34-41. (*Quarterly Most-downloaded Articles, as of June 2017*)
33. **X. J. Li**[*], H. Li, H.-Y. Chang, G. Lykotrafitis, and G. E. Karniadakis[*]. "Computational biomechanics of human red blood cells in hematological disorders". *ASME J. Biomech. Eng.* **2017**, *139*, 020804.
32. A. Blumers, Y.-H. Tang, Z. Li, **X. J. Li**, and G. E. Karniadakis[*]. "GPU-accelerated red blood cells simulations with transport dissipative particle dynamics". *Comput. Phys. Commun.* **2017**, *217*, 171-179.
31. **X. J. Li**, E. Du, H. Lei, Y.-H. Tang, M. Dao, S. Suresh, and G. E. Karniadakis[*]. "Patient-specific modeling and predicting blood viscosity in sickle-cell anemia". *Interface Focus* **2016**, *6*, 20150065.
30. H.-Y. Chang, **X. J. Li**[*], H. Li, and G. E. Karniadakis[*]. "MD/DPD multiscale framework for predicting morphology and stresses of red blood cells in health and disease". *PLOS Comput. Biol.* **2016**, *12*, e1005173.
29. L. Lu, **X. J. Li**[*], P. G. Vekilov, and G. E. Karniadakis[*]. "Probing the twisted structure of sickle hemoglobin fibers via particle simulations". *Biophys. J.* **2016**, *110*, 2085-2093. (*Feature Article*)
28. A. Yazdani[§], **X. J. Li**[§], and G. E. Karniadakis[*]. "Dynamic and rheological properties of soft biological cell suspensions". *Rheol. Acta* **2016**, *55*, 433-449.
27. Y.-H. Tang, Z. Li, **X. J. Li**, M. G. Deng, and G. E. Karniadakis[*]. "Non-equilibrium dynamics of vesicles and micelles by self-assembly of thermoresponsive block copolymers". *Macromolecules* **2016**, *49*, 2895-2903.
26. K. Lykov[§], **X. J. Li**[§], H. Lei, I. V. Pivkin[*], and G. E. Karniadakis[*]. "Inflow/outflow boundary conditions for particle-based blood flow simulations: Application to arterial bifurcations and trees". *PLOS Comput. Biol.* **2015**, *11*, e1004410. (*Highlighted on LAMMPS homepage*)
25. Z. Li, Y.-H. Tang, **X. J. Li**, and G. E. Karniadakis[*]. "Mesoscale modeling of phase transition dynamics of thermoresponsive polymers". *Chem. Commun.* **2015**, *51*, 11038-11040.
24. **X. J. Li**, Y.-H. Tang, H. J. Liang[*], and G. E. Karniadakis[*]. "Large-scale dissipative particle dynamics simulations of self-assembled amphiphilic systems". *Chem. Commun.* **2014**, *50*, 8306-8308.
23. **X. J. Li**, Z. L. Peng, H. Lei, M. Dao, and G. E. Karniadakis[*]. "Probing red blood cell mechanics, rheology and dynamics with a two-component model". *Philos. Trans. R. Soc. A.* **2014**, *372*, 20130389.
22. Z. L. Peng, I. V. Pivkin, **X. J. Li**, G. E. Karniadakis , and M. Dao. "Two-component dissipative particle dynamics model of red blood cells". *Biophys. J.* **2014**, *106*, 573A.
21. **X. J. Li**, P. V. Vlahovska, and G. E. Karniadakis[*]. "Continuum- and particle-based modeling of shapes and dynamics of red blood cells in health and disease". *Soft Matter* **2013**, *9*, 28-37.
20. **X. J. Li**[*]. "Shape transformations of bilayer vesicles from amphiphilic block copolymers: A dissipative particle dynamics simulation study". *Soft Matter* **2013**, *9*, 11663-11670.

19. Z. L. Peng, **X. J. Li**, I. V. Pivkin, M. Dao, G. E. Karniadakis and S. Suresh*. "Lipid–bilayer and cytoskeletal interactions in a red blood cell". *Proc. Natl. Acad. Sci. U.S.A.* **2013**, *110*, 13356-13361.
18. **X. J. Li***, I. V. Pivkin*, and H. J. Liang*. "Hydrodynamic effects on flow-induced polymer translocation through a microfluidic channel". *Polymer* **2013**, *54*, 4309-4317.
17. **X. J. Li**, B. Caswell, and G. E. Karniadakis*. "Effect of chain chirality on the self-assembly of sickle hemoglobin". *Biophys. J.* **2012**, *103*, 1130-1140.
16. **X. J. Li**, A. S. Popel, and G. E. Karniadakis*. "Blood-plasma separation in Y-shaped bifurcating microfluidic channels: A dissipative particle dynamics simulation study". *Phys. Biol.* **2012**, *9*, 026010.
15. **X. J. Li***, X. L. Li, M. G. Deng, and H. J. Liang* "Effects of electrostatic interactions on the translocation of polymers through a narrow pore under different solvent conditions: A dissipative particle dynamics simulation study". *Macromol. Theory Simul.* **2012**, *21*, 120-129. (*Monthly and Yearly Most-accessed Articles, as of March 2013*)
14. J. Y. Guo, **X. J. Li***, and H. J. Liang*. "Dissipative particle dynamics simulations of fluid-driven polymer through a microchannel". *Acta Polym. Sin.* **2012**, *2*, 160-167.
13. Y. F. Li, **X. J. Li**, Z. H. Li, and H. J. Gao*. "Surface–structure–regulated penetration of nanoparticles across cell membrane". *Nanoscale* **2012**, *4*, 3768-3775.
12. M. G. Deng, **X. J. Li**, H. J. Liang, B. Caswell, and G. E. Karniadakis*. "Simulation and modeling of slip flow over surfaces grafted with polymer brushes and glycocalyx fibers". *J. Fluid Mech.* **2012**, *711*, 192-211.
11. J. Guo, **X. J. Li***, Y. Liu, and H. J. Liang*. "Flow-induced translocation of polymers through a fluidic channel: A dissipative particle dynamics simulation study". *J. Chem. Phys.* **2011**, *134*, 134906.
10. P. T. He, **X. J. Li***, M. G. Deng, T. Chen, and H. J. Liang*. "Complex micelles from the self-assembly of coil-rod-coil amphiphilic triblock copolymers in selective solvents". *Soft Matter* **2010**, *6*, 1539-1546.
9. P. T. He§, **X. J. Li**§,*, D. Z. Kou, M. G. Deng, and H. J. Liang*. "Complex micelles from the self-assembly of amphiphilic triblock copolymer in selective solvents". *J. Chem. Phys.* **2010**, *132*, 204905.
8. M. G. Deng, Y. Jiang, **X. J. Li***, Y. Liu, L. Wang, and H. J. Liang*. "Conformational behaviors of a charged-neutral star micelle in salt-free solution". *Phys. Chem. Chem. Phys.* **2010**, *12*, 6135-6139.
7. **X. J. Li**, I. V. Pivkin, H. J. Liang*, and G. E. Karniadakis*. "Shape transformations of membrane vesicles from amphiphilic triblock copolymers: A dissipative particle dynamics simulation study". *Macromolecules* **2009**, *42*, 3195-3200.
6. **X. J. Li**, J. Guo, Y. Liu, and H. J. Liang*. "Microphase separation of poly (styrene-*b*-isoprene) diblock copolymer: A dissipative particle dynamics simulation study". *J. Chem. Phys.* **2009**, *130*, 074908.
5. **X. J. Li**, Y. Liu, L. Wang, M. G. Deng, and H. J. Liang*. "Fusion and fission pathways of vesicles from amphiphilic triblock copolymers: A dissipative particle dynamics simulation study". *Phys. Chem. Chem. Phys.* **2009**, *11*, 4051-4059.
4. **X. J. Li**, M. G. Deng, Y. Liu, and H. J. Liang*. "Dissipative particle dynamics simulations of toroidal structure formations of amphiphilic triblock copolymers". *J. Phys. Chem. B* **2008**, *112*, 14762-14765.
3. S. L. Rao, **X. J. Li**, and H. J. Liang*. "Developing coarse-grained force fields for polystyrene with different chain lengths from atomistic simulation". *Macromol. Res.* **2007**, *15*, 610-616.
2. **X. J. Li**, D. Kou, S. Rao, and H. J. Liang*. "Developing a coarse-grained force field for the diblock copolymer poly (styrene-*b*-butadiene) from atomistic simulation". *J. Chem. Phys.* **2006**, *124*, 204909.
1. **X. J. Li**, X. J. Ma, L. Huang, and H. J. Liang*. "Developing coarse-grained force fields for *cis*-poly (1,4-butadiene) from the atomistic simulation". *Polymer* **2005**, *46*, 6507-6512.

BOOK/CHAPTER/ESSAY

8. **X. J. Li**, H. J. Lu, and Z. L. Peng. "Continuum- and particle-based modeling of human red blood cells". Chapter in *Handbook of Materials Modeling (Vol. 2)*. Springer, 2018, to appear.
7. **X. J. Li** and H. Lei. " Multiscale modeling of sickle cell anemia". Chapter in *Handbook of Materials Modeling (Vol. 2)*. Springer, 2018, to appear.
6. H. J. Liang, **X. J. Li**, and X. H. He. "Macromolecular Self-Assembling Systems: Theory and Simulation". Chapter in *Macromolecular Self-Assembly (2rd version)*. Science Press, 2018, to appear. (*In Chinese*)
5. Z. Li, X. Bian, **X. J. Li**, M. Deng, Y.-H. Tang, B. Caswell, and G. E. Karniadakis. "Dissipative Particle Dynamics: Foundation, Evolution, Implementation, and Applications". Chapter in *Particles in Flows*. Birkhauser/Springer, 2017, 255-326.
4. **X. J. Li** and G. E. Karniadakis. "*In-silico* medicine: multiscale modeling of hematological disorders". *SIAM News* **2017**, *50*, online.[1]
3. **X. J. Li**, Z. Li, X. Bian, M. G. Deng, C. H. Kim, Y.-H. Tang, A. Yazdani, and G. E. Karniadakis. "Dissipative Particle Dynamics, Overview". Essay in *Encyclopedia of Nanotechnology*. Springer, 2016, 793–800.
2. X. H. He, **X. J. Li**, P. Chen, and H. J. Liang. "Dynamics simulations of microphase separation in block copolymers". Chapter in *Polymer morphology: principles, characterization, and processing*. John Wiley & Sons, Inc., 2016, 283-298.
1. **X. J. Li**, R. Huang, P. Chen, Y. Jiang, and H. J. Liang "Introduction to theoretical and modeling methods in polymer sciences". Chapter in *Frontier aspects and development of polymer sciences*. Science Press, 2006, 375-395. (*In Chinese*)

REFERRED CONFERENCE PUBLICATIONS

20. **X. J. Li**, Y. Deng, E. Du, L. Lu, M. Dao, J. M. Higgins,and G. E. Karniadakis. "Multiscale modeling of sickle cell disease". 2018 NIH IMAG Futures Meeting – Moving Forward with the MSM Consortium, Bethesda, 2018. 03.
19. **X. J. Li**, E. Du, L. Lu, M. Dao, J. M. Higgins,and G. E. Karniadakis. "Patient-specific modeling of biomechanics and biorheology of red blood cells in sickle cell anemia". 2017 NIH IMAG 10th Anniversary Multiscale Modeling Consortium Meeting, Bethesda, 2017. 03.
18. **X. J. Li**, M. Dao, J. M. Higgins,and G. E. Karniadakis. "Patient-specific modeling of individual sickle cell behavior under hypoxic conditions". 2016 Red Cell Club Meeting, Manhasset, 2016. 10.
17. **X. J. Li**, E. Du, Z. Li, Y.-H. Tang, L. Lu, M. Dao and G. E. Karniadakis. "Patient-specific modeling and analysis of dynamic behavior of individual sickle red blood cells under hypoxic conditions". 68^{th} Annual Meeting of the APS Division of Fluid Dynamics, Boston, 2015. 11.
16. **X. J. Li**, M. Dao,and G. E. Karniadakis. "Direct observation of individual sickle cell behavior under transient hypoxia". 2015 IMAG Multiscale Modeling Consortium Meeting, Bethesda, 2015. 09.
15. **X. J. Li**, E. Du, M. Dao, and G. E. Karniadakis. "Patient-specific prediction of blood viscosity in sickle cell anemia". 2014 IMAG Multiscale Modeling Consortium Meeting, Bethesda, 2014. 09.
14. **X. J. Li**, H. Lei, E. Du, M. Dao, and G. E. Karniadakis. "Rheology of sickle cell anemia: Effects of heterogeneous RBC shapes". 2014 SIAM Annual Meeting, Chicago, 2014. 07.
13. **X. J. Li**, K. Lykov, I. V. Pivkin, and G. E. Karniadakis. "Mesoscopic modeling of blood flow in arterial bifurcations". 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, 2013. 11.

[1] https://sinews.siam.org/Details-Page/in-silico-medicine-multiscale-modeling-of-hematological-disorders.

12. **X. J. Li**, Z. L. Peng, M. Dao, and G. E. Karniadakis. "Probing red blood cell mechanics, rheology and dynamics with a two-component model". Red Cell Club 2013, New York, 2013. 10. (Invited talk)
11. **X. J. Li**, I. V. Pivkin, and G. E. Karniadakis. "Multiscale modeling of blood-plasma separation in bifurcations". Engineering Mechanics Institute Conference 2013, Evanston, 2013. 08.
10. **X. J. Li**, B. Caswell, and G. E. Karniadakis. "Morphology and chirality control self-assembly of sickle hemoglobin inside red blood cells". SES 50th Annual Technical Meeting, Providence, 2013. 07.
9. **X. J. Li** and G. E. Karniadakis. "Morphology and chirality control self-assembly of sickle hemoglobin inside red blood cells". 2013 NIMBioS Investigative Workshop–Modeling Blood Cell Interactions, Knoxville, 2013. 06. (Invited talk)
8. B. Caswell, H. Lei, **X. J. Li**, and G. E. Karniadakis. "Occlusion by cell-cell and cell-wall adhesion in sickle cell disease". 2012 AIChE Annual Meeting, Pittsburgh, 2012. 10.
7. **X. J. Li**, H. Lei, B. Caswell, and G. E. Karniadakis. "Morphology and chirality control self-assembly of sickle hemoglobin inside red blood cells". APS March Meeting 2012, Boston, 2012. 03. (Invited talk in *Self-Assembling Structures Press Conference*)
6. **X. J. Li**, A. S. Popel, and G. E. Karniadakis. "Multiscale modeling of blood-plasma separation in bifurcations". 64^{th} Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, 2011. 11.
5. **X. J. Li**, B. Caswell, and G. E. Karniadakis*. "Mesoscopic modeling of the self-assembly of sickle cell hemoglobin". 83^{rd} Annual Meeting of the Society of Rheology, Cleveland, 2011. 10.
4. **X. J. Li**, P. T. He, and H. J. Liang. "Fluid-driven polymer translocation through a microchannel". 27^{th} CCS (Chinese Chemical Society) Congress, Xiamen, P. R. China, 2010. 06. (Invited talk in the session of *Study of Theory, Analogism and Calculation on Polymer Sciences*)
3. **X. J. Li** and H. J. Liang "Multiscale modeling and simulation of block copolymer". The National Polymer Conference in 2009 (NPC 2009), Tianjin, China, 2009. 08.
2. **X. J. Li**, M. G. Deng, and H. J. Liang. "Theoretical computation and simulations on self-assembly of block copolymers". 5^{th} East-Asian Polymer Conference (EAPC-5), Shanghai, China, 2008. 06.
1. **X. J. Li**, S. L. Rao, D. Z. Kou, and H. J. Liang. "Developing a coarse-grained force field for polymer from atomistic simulation". 4^{th} East-Asian Polymer Conference (EAPC-4), Tianjin, China, 2006. 05.

PROFESSIONAL SERVICE

Member:

- American Physical Society
- Chinese Chemical Society
- Institute of Physics

Reviewer/Panelist for Research Proposals Submitted to:

- National Institutes of Health (NIH)
- Swiss National Supercomputing Centre (CSCS)

Advisory Board:

- Review Editor for Frontiers in Physics
- International Advisory Committee for ICASET-17

Reviewer for:

- ACS Nano
- Soft Matter
- Journal of Biomechanics
- Journal of Computational Physics
- Physics of Fluids
- Biomicrofluidics
- Journal of Chemical Physics
- Science China Chemistry
- WIREs Systems Biology and Medicine
- Colloids and Surfaces A: Physicochemical and Engineering Aspects
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- Applied Mathematics and Mechanics
- Journal of Pain Research
- Acta Physico-Chimica Sinica
- Chinese Journal of Chemistry
- Chinese Journal of Chemical Physics
- Biophysical Journal
- Macromolecules
- Physical Review E
- SIAM Journal on Scientific Computing
- IEEE Transactions on Nanotechnology
- Biomechanics & Modeling in Mechanobiology
- Polymer
- Science China Physics, Mechanics and Astronomy
- Colloids and Surfaces B: Biointerfaces
- International Journal of Numerical Methods for Heat and Fluid Flow
- International Journal for Numerical Methods in Biomedical Engineering
- Theoretical Biology and Medical Modelling
- PLOS One
- Sensors
- Micromachines
- Chinese Journal of Polymer Science
- Chemical Journal of Chinese Universities