# PENGTAO YUE

Professor

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Google Scholar: https://scholar.google.com/citations?user=c34qQvYAAAAJ&hl=en

## EDUCATION

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|---|---|
| **1997.9-2002.7** | **Ph.D./ Fluid Mechanics** |
| | University of Science and Technology of China, Hefei, Anhui, P. R. China |
| **1993.9-1997.7** | **B.Sc./ Theoretical and Applied Mechanics** |
| | University of Science and Technology of China, Hefei, Anhui, P. R. China |

## EMPLOYMENT

- 2021.8-present  Professor, Department of Mathematics, Virginia Polytechnic Institute and State University
- 2014.8-2021.8  Associate Professor, Department of Mathematics, Virginia Polytechnic Institute and State University
- 2008.8-2014.8  Assistant Professor, Department of Mathematics, Virginia Polytechnic Institute and State University
- 2007.7-2008.6  Research Associate, Department of Mathematics and Department of Chemical and Biological Engineering, University of British Columbia
- 2004.6-2007.6  Postdoctoral Research Fellow, Department of Mathematics and Department of Chemical and Biological Engineering, University of British Columbia
- 2002.8-2004.6  Postdoctoral Research Associate, Benjamin Levich Institute for Physico-Chemical Hydrodynamics, City College of CUNY
- 1997.9-2002.7  Graduate Research Assistant, Shockwave Research Laboratory, Department of Modern Mechanics, University of Science and Technology of China

## VISITING POSITIONS

- 2011.6-2011.7    Visiting Assistant Professor, Department of Mathematics, Hong Kong University of Science and Technology

## RESEARCH INTERESTS

Computational fluid dynamics, complex fluids, interfacial flows, wetting dynamics, phase transition, drop and bubble dynamics, particle-bubble interaction, magnetic drug targeting, and crack propagation.

## COURSES TAUGHT

- **Virginia Polytechnic Institute and State University**
  - Math 1124H: Vector Geometry
  - Math 2214: Introduction to Differential Equations
  - Math 3034: Introduction to Mathematical Proofs
  - Math 3054: Programming for Mathematical Problem Solving
  - Math 3144: Linear Algebra (I)
  - Math 3214: Calculus of Several Variables
  - Math 4445: Introduction to Numerical Analysis (I)
  - Math 4446: Introduction to Numerical Analysis (II)
  - Math 5474: Finite Difference Method
  - Math 5484: Finite Element Method
- **University of British Columbia**
  - Math 104/184: Differential Calculus

## RESEARCH GRANTS

- National Science Foundation DMS-2012480, Collaborative Research: Models, algorithms, and applications for three-phase system with solidification and moving contact lines. PI: P. Yue, 9/1/2020-8/31/2023, $165,000.
- National Science Foundation CBET-1604272, Exploiting Vapor Pressure Gradients to Suppress In-Plane Frost Growth. PI: J. Boreyko, Co-PI P. Yue, 8/15/2016-8/14/2019, $328,298.
- National Science Foundation DMS-1522604, Hybrid Numerical Methods for Three-Phase Flows with Moving Contact Lines. PI: P. Yue, 9/1/2015-8/31/2019, $167,234.
- National Science Foundation DMS-0907788, Computational study of drop deformation in systems with two immiscible liquids. PI: Y. Renardy, Co-PI: P. Yue. 6/1/2009-5/31/2012, $247,880.

## AWARDS

- **University of Science and Technology of China, Graduate:**
  - University Outstanding Graduate                                     2002
  - Qiushi Graduate Scholarship                                         2000
  - Guanghua Educational Foundation Scholarship                        1999
- **University of Science and Technology of China, Undergraduate:**
  - Outstanding Student Scholarship                                    1996-1997
  - Outstanding Student Scholarship                                    1995-1996
  - P & G Scholarship                                                   1994-1995

## PUBLICATIONS

### In press

[1]  Li, L., Zhang, J., Xu, Z., Young, Y.-N., Feng J.J., and Yue, P. An arbitrary Lagrangian-Eulerian method for simulating interfacial dynamics between a hydrogel and a fluid. *Journal of Computational Physics*, in press

### Peer-reviewed journal publications

[J1]  Yue, P., 2020. Thermodynamically consistent phase-field modelling of contact angle hysteresis. *Journal of Fluid Mechanics* 899: A15. (41 pages)

[J2]  Zhang, J. and Yue, P., 2020. A level-set method for moving contact lines with contact angle hysteresis. *Journal of Computational Physics* 418: 109636. (22 pages)

[J3]  Cui, M., Gao, Q., Bowland, C., Burgeson, E., Hong, K., Yue, P., and Naskar, A., 2020. A cast net thrown onto an interface: wrapping 3D objects with an interfacial-jammed amphiphilic sheet. *Advanced Materials Interfaces* 7: 1901751. (8 pages)

[J4]  Ahmadi, S. F., Nath, S., Kingett, C. M., Yue, P., and Boreyko, J. B., 2019. How soap bubbles freeze. *Nature Communications*, 10: 2531. (10 pages)

[J5]  Adjerid, S., Chaabane, N., Lin, T., and Yue, P., 2019. An immersed discontinuous finite element method for the Stokes problem with a moving interface. *Journal of Computational and Applied Mathematics* 362: 540-559.

[J6]  Yang, F.-C., Chen, X.-P., and Yue, P., 2019. The influence of "gas" viscosity on water entry of hydrophobic spheres. *European Physical Journal E* 42: 34. (9 pages)

[J7]  Zhang, J. and Yue, P., 2019. A High-order and interface-preserving discontinuous Galerkin method for level-set reinitialization. *Journal of Computational Physics*. 378: 634-664.

[J8]  Ahmadi, S. F., Nath, S., Iliff, G. J., Srijanto, B. R., Collier, C. P., Yue, P., and Boreyko, J. B., 2018. Passive anti-frosting surfaces using microscopic ice stripe arrays. *ACS Applied Materials & Interfaces* 10(38): 32874-32884.

[J9]  Nath, S., Bisbano, C., Yue, P., and Boreyko, J., 2018. Dueling dry zones around hygroscopic droplets, *Journal of Fluid Mechanics* 853: 601-620.

[J10] Worner, M., Cai, X., Alla, H., and Yue, P., 2018. A semi-analytical method to estimate the effective slip length of spreading spherical-cap shaped droplets using Cox theory. *Fluid Dynamics Research* 50(3): 035501. (17 pages)

[J11] Yang, F.-C., Chen, X.-P., and Yue, P., 2018. Surface roughness effects on contact line motion with small capillary number. *Physics of Fluids* 30: 012106. (10 pages)

[J12] Rukshin, I., Mohrenweiser, J., Yue, P., and Afkhami, S., 2017. Modeling superparamagnetic particles in blood flow for applications in magnetic drug targeting. *Fluids*, 2(2): 29. (12 pages)

[J13] Hou, Y., Wang, L., Yue, P., and Sun, W., 2015. Fracture failure in crack interaction of asphalt binder by using a phase field approach. *Materials and Structures* 48: 2997-3008.

[J14] Mohammadigoushki, H., Yue, P., Feng, J. J., 2014. Bubble migration in two-dimensional foam sheared in a wide-gap Couette device: Effects of non-Newtonian rheology. *Journal of Rheology* 58: 1809-1827.

[J15] Hou, Y., Yue, P., Xin, Q., Pauli, T., Sun, W., and Wang, L., 2014. Fracture failure of asphalt binder in mixed mode (Mode I & Mode II) by using phase field model. *Road Materials and Pavement Design* 15: 167-181.

[J16] Hou, Y., Wang, L., Yue, P., Pauli, T., and Sun, W., 2014. Modeling mode I cracking failure in asphalt binder by using nonconserved phase-field model. *Journal of Materials Civil Engineering* 26: 684–691.

[J17] Yue, P. and Renardy, Y., 2013. Spontaneous penetration of a non-wetting drop into an exposed pore. *Physics of Fluids* 25: 052104.

[J18] Qin, T., Ragab, S., and Yue, P., 2013. Axisymmetric simulation of the interaction of a rising bubble with a rigid surface in viscous flow. *International Journal of Multiphase Flow* 52: 60–70.

[J19] Yue, P. and Feng, J. J., 2012. Phase-field simulations of dynamic wetting of viscoelastic fluids. *Journal of Non-Newtonian Fluid Mechanics* 189-190: 8-13.

[J20] Yue, P., Lee, S., Afkhami, S., and Renardy, Y., 2012. On the motion of superparamagnetic particles in magnetic drug targeting. *Acta Mechanica* 223: 505-527.

[J21] Yue, P. and Feng, J. J., 2011. Can diffuse-interface models quantitatively describe moving contact lines? *The European Physical Journal Special Topics* 197: 37-46.

[J22] Vélez-Corderoa, J. R., Sámanoa, D., Yue, P., Feng, J. J., and Zenit, R., 2011. Hydrodynamic interaction between a pair of bubbles ascending in shear-thinning inelastic fluids. *Journal of Non-Newtonian Fluid Mechanics* 166: 118-132.

[J23] Yue, P. and Feng, J. J., 2011. Wall energy relaxation in the Cahn-Hilliard model for moving contact lines. *Physics of Fluids* 23: 012106. (8 pages)

[J24] Yue, P., Zhou, C., and Feng, J. J., 2010. Sharp interface limit of the Cahn-Hilliard model for moving contact lines. *Journal of Fluid Mechanics* 645: 279-294.

[J25] Zhou, C., Yue, P., Feng, J. J., Ollivier-Gooch, C. F., and Hu, H. H., 2010. 3D phase-field simulations of interfacial dynamics in Newtonian and viscoelastic fluids. *Journal of Computational Physics* 229: 498-511.

[J26] Zhou, C., Yue, P., and Feng, J. J., 2010. Dynamic simulation of capillary breakup of nematic fibers: molecular orientation and interfacial rupture. *Journal of Computational and Theoretical Nanoscience* 7: 683-692.

[J27] Afkhami, S., Yue, P., and Renardy, Y., 2009. A comparison of viscoelastic stress wakes for 2D and 3D Newtonian drop deformation in a viscoelastic matrix under shear. *Physics of Fluids* 21: 072106. (7 pages)

[J28] Xia, Z., Connington, K. W., Rapaka, S., Yue, P., Feng, J. J., and Chen, S., 2009. Flow patterns in the sedimentation of an elliptical particle. *Journal of Fluid Mechanics* 625: 249-272.

[J29] Yue, P., Zhou, C., Dooley, J., and Feng, J. J., 2008. Elastic encapsulation in bicomponent stratified flows of viscoelastic fluids. *Journal of Rheology* 52: 1027-1042.

[J30] Zhou, C., Yue, P., and Feng, J. J., 2008. Dynamic simulation of droplet interaction and self-assembly in a nematic liquid crystal. *Langmuir* 24: 3099-3110.

[J31] Zhou, D., Yue, P., and Feng, J. J., 2008. Viscoelastic effects on drop deformation in a converging pipe flow. *Journal of Rheology* 52: 469-487.

[J32] Yue, P., Dooley, J., and Feng, J. J., 2008. A general criterion for viscoelastic secondary flow in pipes of noncircular cross section. *Journal of Rheology* 52: 315-332.

[J33] Zhou, C., Yue, P., and Feng, J. J., 2008. Deformation of a compound drop through a contraction in a pressure-driven pipe flow. *International Journal of Multiphase Flow* 34:

102-109.

[J34] Zhou, C., Yue, P., and Feng, J. J., 2007. The rise of Newtonian drops in a nematic liquid crystal. *Journal of Fluid Mechanics* 593: 385-404.

[J35] Yue, P., Feng, J. J., Bertelo, C. A., and Hu, H. H., 2007. An arbitrary Lagrangian-Eulerian method for simulating bubble growth in polymer foaming. *Journal of Computational Physics* 226: 2229-2249.

[J36] Zhou, C., Yue, P., Feng, J. J., Liu, C., and Shen, J., 2007. Heart-shaped bubbles rising in anisotropic liquids. *Physics of Fluids* 19: 041703.

[J37] Yue, P., Zhou, C., and Feng, J. J., 2007. Spontaneous shrinkage of drops and mass conservation in phase-field simulations. *Journal of Computational Physics* 233: 1-9.

[J38] Zhou, C., Yue, P., and Feng, J. J., 2007. Simulation of neutrophil deformation and transport in capillaries using Newtonian and viscoelastic drop models. *Annals of Biomedical Engineering* 35: 766-780.

[J39] Chin, L., Yue P., Feng, J. J., and Seow, C.Y., 2006. Mathematical simulation of muscle crossbridge cycle and force-velocity relationship. *Biophysical Journal* 91: 3653-3663.

[J40] Yue, P., Zhou, C., and Feng, J. J., 2006. A computational study of the coalescence between a drop and an interface in Newtonian and viscoelastic fluids. *Physics of Fluids* 18: 102102. (14 pages)

[J41] Zhou, C., Yue, P., and Feng, J. J., 2006. Formation of simple and compound drops in microfluidic devices. *Physics of Fluids* 18: 092105. (14 pages)

[J42] Yue, P., Zhou, C., Feng, J. J., Ollivier-Gooch, C., and Hu, H.H., 2006. Phase-field simulations of interfacial dynamics in viscoelastic fluids using finite elements with adaptive meshing. *Journal of Computational Physics* 219: 47-67.

[J43] Yue, P., Feng, J. J., Liu, C., and Shen, J., 2005. Transient drop deformation upon startup of shear in viscoelastic fluids. *Physics of Fluids* 17: 123101. (6 pages)

[J44] Yue, P., Feng, J. J., Liu, C., and Shen, J., 2005. Viscoelastic effects on drop deformation in steady shear. *Journal of Fluid Mechanics* 540: 427-437.

[J45] Yue, P., Feng, J. J., Liu, C., and Shen, J., 2005. Interfacial forces and Marangoni flow on a nematic drop retracting in an isotropic fluid. *Journal of Colloid and Interface Science* 290: 281-288.

[J46] Yue, P., Feng, J. J., Liu, C., and Shen, J., 2005. Diffuse-interface simulations of drop coalescence and retraction in viscoelastic fluids. *Journal of Non-Newtonian Fluid Mechanics* 129: 163-176.

[J47] Yue, P., Feng, J. J., Liu, C., and Shen, J., 2004. A diffuse-interface method for simulating two-phase flows of complex fluids. *Journal of Fluid Mechanics* 515: 293-317.

**Journal papers based on doctoral work**

[J48] Xu Shengli, Yue Pengtao, Liu Kai, Zhu Zuojin. Experimental visualization on natural gas-air mixing in engine intake. *Experiments and Measurements in Fluid Mechanics* Vol. 19, No. 4, 2005, p 74-79.

[J49] Xu Shengli, Liu Kai, Zhu Zuojin, Yue Pengtao. Numerical experiments of three dimensional mixing of natural gas and air. *Journal of Hydrodynamics* Vol. 17, No. 1, 2005, p 12-21.

[J50] Tang Jingyou, Yue Pengtao, Gu Yan, Hu Haibo, Xu Shengli, Dong Qingdong. One-dimensional numerical computation for equation of state of gaseous methane under shock compression. *Acta Aerodynamica Sinica* Vol. 21, No. 2, 2003, p 164.

[J51] Tang Jingyou, Yue Pengtao, Xu Shengli, Gu Yan, Dong Qingdong. Study on the optimization for the protective atmosphere of pins in hydrodynamic measurements. *Experiments and Measurements in Fluid Mechanics* Vol 17, No.1, 2003, p 28.

[J52] Yue Pengtao, Xu Shengli, Liu Dayou, Duan Xinping. Numerical investigation on mud bed-generation and impacting a wall along a slope. *Journal of Hydrodynamics* Vol.14, No.2,

2002, p 7-11.

[J53] Xu Shengli, Yue Pengtao, Liu Dayou, Duan Xinping. Numerical simulation on cylindrical Bingham fluid impacted to a solid wall and fluid surface. *Explosion and Shock Waves* Vol.22, No.1, 2002, p 8-14.

[J54] Xu Shengli, Yue Pengtao, Zhang Mengping. Numerical investigation on supersonic combustion of hydrogen enhanced by a cavity flame holder. *Journal of Propulsion Technology* Vol.22, No.6, 2001, p 505-509.

[J55] Yue Pengtao, Zhang Mengping, Xu Shengli. Numerical investigation on mixing of atomized kerosene in supersonic flow with $H_2$ pilot flame. *Journal of Propulsion Technology* Vol. 22, No.6, 2001, p 500-504.

[J56] Yue Pengtao, Xu Shengli, Liu Dayou,Duan Xinping. Numerical investigation on two-dimensional cylindrical mud impacting to walls and mud surfaces. *Journal of University of Science and Technology of China* Vol. 31, No.5, 2001, p 518-527.

[J57] Xu Shengli, Yue Pengtao, Han Zhaoyuan. Numerical studies on the mixing of $CH_4$ and kerosene injected into a supersonic flow with $H_2$ pilot injection. *Applied Mathematics and Mechanics* Vol. 22, No.4, 2001, p 468-477.

[J58] Xu Shengli, Yue Pengtao, Han Zhaoyuan. Study on the fuel mixing induced by a shock wave propagating into the $H_2$/air interface. *Applied Mathematics and Mechanics* Vol. 22, No.4, 2001, p 460-467.

[J59] Yue Pengtao, Xu Shengli, Zhang Peng. Numerical study on a moving shock diffracted over the cylinder/square column in hydrogen air mixture. *Chinese Journal of Computational Physics* Vol. 18, No.1, 2001, p 10-16.

[J60] Yue Pentao, Xu Shengli, Zhang Shudao, Han Zhaoyuan. Numerical simulation of a dual-combustor scramjet flow-field. *Acta Mechanica Sinica* Vol.32, No.6, 2000, p 657-666.

[J61] Xu Shengli, Zhang Hongjie, Yue Pengtao, Han Zhaoyuan. Study on properties of pressure waves generated by steady flames in a duct. *Journal of University of Science and Technology of China* Vol.30, No.4, 2000, p 387-392.

[J62] Xu Shengli, Yue Pengtao, Archer R D, Milton B E. Experimental study on the unsteady transverse injection of diesel into a subsonic and supersonic flow. *Journal of Combustion Science and Technology* Vol.6, No.2, 2000, p 101-106.

[J63] Xu Shengli, Archer R D, Milton B E, Yue Pengtao. Experimental study on unsteady transverse injection of kerosene into a supersonic flow. *Science in China (Series E)* Vol.43, No.2, 2000, p 206-214.

[J64] Yue Pengtao, Xu Shengli, Peng Jinhua. Three dimensional computation on the interaction between FAE blast waves and the target on the ground. *Explosion and Shock Waves* Vol.20, No.2, 2000, p 1-6.

[J65] Xu Shengli, Yue Pengtao, Peng Jinhua. Three dimensional computation on the interaction of blast waves generated by multi-sources of FAE. *Explosion and Shock Waves*. Vol.20, No.1, 2000, p 1-6.

[J66] Xu Shengli, Yue Pentao, Sun Yingying, Han Zhaoyuan. Three dimensional numerical simulation of atomized fuels injected into a supersonic flow. *Chinese Journal of Applied Mechanics* Vol.17, No.2, 2000, p 19-23.

[J67] Xu Shengli, Yue Pengtao, Han Zhaoyuan, Sun Yingying. Numerical simulation of atomized fuels transversely injected into a supersonic flow. *Acta Aerodynamica Sinica* Vol.18, No.1, 2000, p 39-45.

**Book chapters and others**

[1] Hou, Y., Zhang, L., Yue, P., Pauli, T., Sun, F., and Wang, L. Mode II cracking failure in asphalt concrete by using a non-conserved phase field model. Multiscale Modeling and Characterization: Proceedings of the International RILEM Symposium Stockholm, June 2013, editors: N. Kringos, B. Birgisson, D. Frost, and L. Wang, Springer Netherlands, 2013, pages

127-138. (DOI: 10.1007/978-94-007-6878-9_10).

[2] Hou, Y., Yue, P., Wang, L., Sun, W., Pauli, T., Wang, D., Zhou, W., and Hu, M. Phase field modeling of Mode I cracking failure in asphalt binder. The 92nd Annual Meeting of Transportation Research Board Compendium of Papers, Paper #13-1554, 2013.

[3] Feng, J. J., Chen, X., Yue, P., Zhou, C. Drop dynamics in complex fluids. in Understanding Soft Condensed Matter via Modeling and Computations (Series in Soft Condensed Matter Vol. 3), editors: Wenbing Hu and An-Chang Shi. World Scientific, 2011.

[4] Feng, J. J., Liu, C., Shen, J., and Yue, P. An energetic variational formulation with phase field methods for interfacial dynamics of complex fluids: advantages and challenges, i*n Modeling of Soft Matter* (IMA Volumes in Mathematics and its Applications), editors: M.-C. T. Calderer and E. Terentjev, Springer, New York, 2005.

[5] Liu, C., Shen, J., Feng, J. J., and Yue, P. Variational approach in two-phase flows of complex fluids: transport and induced elastic stress, Chapter 11 in *Mathematical Models and Methods in Phase Transitions*, editor: Alain Miranville, Nova Publishers, New York, 2005.

[6] Xu, S. L., Han, S., Yue, P. T., Yang, J. M., and Archer, R. D. Numerical investigation on shock passing through a gas particle suspension and diffracting over a wedge in a duct. Shock Waves: Proceedings of the 24th International Symposium on Shock Waves Beijing, China July 11-16, 2004, editor: Z. Jiang, Springer Berlin Heidelberg, 2005, pages 547-556. (DOI: 10.1007/978-3-540-27009-6_82)

## CONFERENCE AND WORKSHOP PRESENTATIONS

[1] "Arbitrary Lagrangian-Eulerian simulations of interfacial dynamics between a hydrogel and a fluid", The 74th APS/DFD Annual Meeting, Phoenix, AZ, November 21-23, 2021.

[2] "Modeling and simulation of hydrogel interfacial dynamics", 2021 AIChE Annual Meeting, Boston, MA, November 7-11, 2021. (online)

[3] "Modeling and simulation of hydrogel interfacial dynamics", XXth International Workshop on Numerical Methods for Non-Newtonian Flows, The Casa Mathematica Oaxaca, June 7-9, 2021. (online)

[4] "Phase-field modeling of contact angle hysteresis and its application in drop impact dynamics". Online Workshop on Modeling and Numerical Methods for Interface Problems, South University of Science and Technology of China, January 28-30, 2021. (online)

[5] "Phase-field modeling of contact angle hysteresis and its application in drop dynamics". 2020 AMS Fall Southeastern Virtual Sectional Meeting, October 10-11, 2020. (online)

[6] "Phase-field modeling of contact angle hysteresis and its application in drop dynamics". Workshop on Analysis, Algorithms and Simulation of Phase Field Models, Xiamen University, July 27-29, 2020. (online)

[7] "Thermodynamically consistent phase-field modeling of contact angle hysteresis". The 43rd Annual Meeting of the SIAM Southeastern Atlantic Section, Knoxville, TN, September 20-22, 2019.

[8] "Thermodynamically consistent modeling of contact angle hysteresis". Workshop on Computational Methods of Partial Differential Equations and Their Applications, Changsha, China, June 22-23, 2019.

[9] "Phase-field simulations of contact angle hysteresis". SIAM conference on Computational Science and Engineering, Spokane, WA, February 25-March 1, 2019

[10] "Numerical simulations of contact angle hysteresis". Workshop on modeling and numerical methods for interfacial dynamics, South University of Science and Technology of China, China, December 15-17, 2018.

[11] "Phase-field simulations of contact angle hysteresis". The 71st APS/DFD Annual Meeting,

Atlanta, GA, November 18-20, 2018

[12] "Phase-field simulation of moving contact lines with contact angle hysteresis". The 42nd SIAM Southeastern Atlantic Sectional Conference, Chapel Hill, NC, March 9-11, 2018

[13] "An energy-stable phase-field method for moving contact line problems". The 70th APS/DFD Annual Meeting, Denver, CO, November 19-21, 2017.

[14] "An immersed discontinuous finite element method for the Stokes problem with a moving interface". The 3rd Annual Meeting of SIAM Central States Section, Fort Collins, CO, September 30-October 1, 2017.

[15] "Hybrid numerical methods for particle dynamics at a fluid interface". BIRS workshop on Mathematics Approaches to Interfacial Dynamics in Complex Fluids, Banff, AB, Canada, June 25-30, 2017.

[16] "An ALE-level-set method for moving boundary problems". SIAM conference on Computational Science and Engineering, Atlanta, GA, February 27-March 3, 2017. (poster)

[17] "Numerical simulation of particle dynamics at a fluid interface". 69th APS/DFD Annual Meeting, Portland, OR. November 20-22, 2016.

[18] "An arbitrary-Lagrangian-Eulerian-phase-field method for contact-line dynamics on moving particles". 11th AIMS Conference on Dynamic Systems, Differential Equations and Applications, Orlando, FL. July 1-5, 2016.

[19] "ALE-phase-field simulations of floating particles". 68th APS/DFD Annual Meeting, Boston, MA. November 22-24, 2015.

[20] "An ALE-Phase-Field Method for Dynamic Wetting of Moving Particles". SIAM Conference on Computational Science and Engineering, Salt Lake City, UT, March 14-18, 2015.

[21] "Phase-field simulations of contact-line dynamics on rough surfaces". 68th APS/DFD Annual Meeting, Boston, MA. November 22-24, 2015.

[22] "Arbitrary Lagrangian-Eulerian simulations of particle and bubble dynamics in non-Newtonian fluids". 66th APS/DFD Annual Meeting, Pittsburgh, PA. November 24-26, 2013.

[23] "An arbitrary Langrangian-Eulerian method for the direct numerical simulation of particle-bubble interactions". 2013 NETL workshop on Multiphase Flow Science, Morgantown, WV. August 6-7, 2013.

[24] "Phase field modeling of Mode I cracking failure in asphalt binder". 92nd Transportation Research Board Annual Meeting, Washington, DC. January 13-17, 2013. (poster)

[25] "Spontaneous penetration of a non-wetting drop into an exposed pore". 65th APS/DFD Annual Meeting, San Diego, CA, November 18-20, 2012.

[26] "A residual thermal stress analysis of asphalt binder by phase field". Society of Engineering Science 49th Annual Technical Meeting, Georgia Tech. October 10-12, 2012.

[27] "Direct numerical simulation of rigid particle-free surface interaction". The 23rd International Congress on Theoretical and Applied Mechanics (ICTAM), Beijing, China. August 19-24, 2012.

[28] "Computational analysis of asphalt binder by phase field method". 2012 Joint Conference of the Engineering Mechanics Institute & 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI-PMC 2012), Notre Dame, IN. June 17-20, 2012.

[29] "Phase-field simulations of dynamic wetting of viscoelastic fluids". 36th Annual SIAM Southeastern Atlantic Section Conference, Huntsville, AL, March 24-25, 2012

[30] "An arbitrary Lagrangian-Eulerian method for flows with particles and bubbles". 11th U.S. National Congress on Computational Mechanics, Minneapolis, MN, July 25-29, 2011

[31] "Several issues in the diffuse-interface modeling of moving contact lines". 7th International Congress on Industrial and Applied Mathematics - ICIAM 2011, Vancouver, BC, Canada, July 18-22, 2011

[32] "An arbitrary-Lagrangian-Eulerian method for simulating particle-bubble interactions".

APS/DFD Annual meeting, Long Beach, CA. November 2010.

[33] "Numerical simulation of the motion of superparamagnetic nanoparticle clusters in a pressure-driven channel flow with an external magnet". APS/DFD Annual Meeting, Long Beach, CA. November, 2010.

[34] "Wall energy relaxation in Cahn-Hilliard model for moving contact lines". APS/DFD Annual Meeting, Minneapolis, MN. November, 2009.

[35] "A numerical study of the hydrodynamic interaction of bubble pairs ascending in non-Newtonian liquids". APS/DFD Annual Meeting, Minneapolis, MN. November, 2009.

[36] "Cahn-Hilliard simulation of moving contact lines in viscoelastic fluids". SoR Annual Meeting, Madison, WI. October, 2009. (poster)

[37] "Cahn-Hilliard model for moving contact lines". American Mathematical Society 2009 Spring Southeastern Sectional Meeting, Rayleigh, NC. April 4-5, 2009.

[38] "Can the Cahn-Hilliard model quantitatively describe moving contact lines?" APS/DFD Annual Meeting, San Antonio, TX. November, 2008

[39] "3D Phase-Field Simulations of Interfacial Dynamics in Viscoelastic Fluids with Adaptive Meshing". APS/DFD Annual Meeting, San Antonio, TX. November, 2008

[40] "Viscoelastic secondary flows in homogeneous and stratified pipe flows". APS/DFD Annual Meeting, Salt Lake City, UT. November, 2007

[41] "Self-assembly of droplets in a nematic liquid crystal". APS/DFD Annual Meeting, Salt Lake City, UT. November, 2007

[42] "Self-assembly of droplets in a nematic liquid crystal". AIChE Annual Meeting, Salt Lake City, UT. November, 2007

[43] "Simulation of bubble growth in polymer foaming". APS/DFD Annual Meeting, Tampa, FL. November, 2006

[44] "Drop-interface partial coalescence in polymeric fluids". APS/DFD Annual Meeting, Tampa, FL. November, 2006

[45] "The shape of bubbles and drops rising in a nematic liquid crystal". APS/DFD Annual Meeting, Tampa, FL. November, 2006

[46] "Simulation of bubble growth in polymer foaming". SoR Annual Meeting, Portland, ME. October, 2006

[47] "The shape of bubbles and drops rising in a nematic liquid crystal". SoR Annual Meeting, Portland, ME. October, 2006

[48] "Simulation of bubble growth in polymer foaming". Interfacial Dynamics in Complex Fluids Workshop, Banff, AB, Canada. May 2006.

[49] "A finite-element phase-field method for simulating interfacial dynamics in complex fluids". APS/DFD Annual Meeting, Chicago, IL. November 2005.

[50] "A computational study of drop formation in microfluidic devices". APS/DFD Annual Meeting, Chicago, IL. November 2005.

[51] "Viscoelastic compound-drop models for neutrophil deformation and transport in capillaries". APS/DFD Annual Meeting, Chicago, IL. November 2005.

[52] "A finite-element phase-field method for simulating interfacial dynamics in complex fluids". AIChE Annual Meeting, Cincinnati, OH. November 2005.

[53] "A finite-element phase-field method for simulating interfacial dynamics in complex fluids". SoR Annual Meeting, Vancouver, BC, Canada. October 2005.

[54] "A computational study of drop formation in microfluidic devices". SoR Annual Meeting, Vancouver, BC, Canada. October 2005.

[55] "Shape of rising bubbles in a nematic liquid crystal". APS/DFD Annual Meeting, Seattle, WA. November, 2004

[56] "Simulation of drop dynamics in complex fluids: drop coalescence and retraction". APS/DFD Annual Meeting, Seattle, WA. Nov, 2004

[57] "Self-assembly of isotropic drops in a nematic matrix simulated by a diffuse-interface

method". APS/DFD Annual Meeting, Seattle, WA. November 2004.

[58] "Simulation of drop dynamics in complex fluid: shear-induced deformation". APS/DFD Annual Meeting, Seattle, WA. November 2004.

[59] "Self-assembly of isotropic drops in a nematic matrix simulated by a diffuse-interface method". AIChE Annual Meeting, Austin, TX. November, 2004.

[60] "Simulation of drop and bubble dynamics using a diffuse-interface model". AIChE Annual Meeting, Austin, TX. November, 2004.

[61] "A diffuse-interface method for simulating the dynamics of drops of complex fluids". AIChE Annual Meeting, San Francisco, CA. November, 2003.

[62] "A diffuse-interface method for simulating the deformation and retraction of liquid crystalline drops". SoR Annual Meeting, Pittsburgh, PA. October, 2003.

[63] "A diffuse-interface method for simulating two-phase flows of complex fluids". 7th U.S. National Congress on Computational Mechanics, Albuquerque, New Mexico. July, 2003.


# INVITED TALKS


[1] "Thermodynamically consistent modeling of complex flows". Department of Mechanical Engineering, Villanova University, December 3, 2021. (online)

[2] "Thermodynamically consistent modeling of contact angle hysteresis". Department of Mathematics and Statistics, University of Limerick, March 5, 2021. (online)

[3] "Thermodynamically consistent modeling of contact angle hysteresis". Department of Mathematics, Northeastern Polytechnical University, June 26, 2019

[4] "Thermodynamically consistent modeling of contact angle hysteresis". Department of Modern Mechanics, University of Science and Technology of China, June 25, 2019

[5] "ALE-phase-field simulations of moving contact lines on moving particles". Department of Mathematics, University of Science and Technology of China, June 24, 2019

[6] "ALE-phase-field simulations of moving contact lines on moving particles". Tsinghua University, June 13, 2019

[7] "Thermodynamically consistent modeling of contact angle hysteresis". Tsinghua University, June 12, 2019

[8] "Thermodynamically consistent modeling of contact angle hysteresis". University of Houston, April 11, 2019

[9] "Numerical simulations of moving boundary problems in complex fluids". Oak Ridge National Laboratory, January 14, 2019.

[10] "Numerical simulations of contact angle hysteresis". Department of Mathematics, Hong Kong University of Science and Technology, December 19, 2018

[11] "Phase-field modeling of contact angle hysteresis". University of British Columbia, July 5, 2018.

[12] "ALE-phase-field simulations of moving contact lines on moving particles". Department of Mechanical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands, June 27, 2016.

[13] "ALE-phase-field simulations of moving contact lines on moving particles". Department of Modern Mechanics, University of Science and Technology of China, Hefei, China, June 13, 2016.

[14] "ALE-phase-field simulations of moving contact lines on moving particles". Beijing Computational Science Research Center, Beijing, China, June 2, 2016.

[15] ALE-phase-field simulations of moving contact lines on moving particles". Institute of Mechanics, Chinese Academy of Sciences, Beijing, China, May 31, 2016.

[16] "ALE-phase-field simulations of moving contact lines on moving particles". Department of Mathematics, University of Tennessee, Knoxville, November 11, 2015.

[17] "ALE-phase-field simulations of moving contact lines on moving particles". Department of Mathematics, Purdue University, April 20, 2015.

[18] "Phase-field method for moving contact lines". Department of Physics, Virginia Tech, December 9, 2013.

[19] "Phase-field modeling of thermal stress and cracking in asphalt binders". International Society for Asphalt Pavements (ISAP) Technical Committee Day, Washington, DC. January 13, 2013.

[20] "Diffuse-interface simulations of moving contact lines". Department of Mathematics, Hong Kong University of Science and Technology, June 22, 2011

[21] "Diffuse-interface simulations of moving contact lines". Department of Mathematical Sciences, New Jersey Institute of Technology, November 5, 2010

[22] "Diffuse-interface simulations of moving contact lines". Department of Mechanical Engineering, City College of New York, May 6, 2010

[23] "Phase-field theory for bicomponent flows of complex fluids". Department of Mathematics, Virginia Tech, January 31, 2008.

[24] "Viscoelastic secondary flows in homogeneous and stratified pipe flows". Complex Fluids Seminar, University of British Columbia, October 4, 2007.

[25] "Simulation of bubble growth in polymer foaming". Department of Modern Mechanics, University of Science and Technology of China, March 15, 2007.

[26] "Simulation of bubble growth in polymer foaming". Institute of Mechanics, Chinese Academy of Sciences, March 5, 2007.

[27] "Simulation of bubble growth in polymer foaming". Air Products and Chemicals Inc., Pennsylvania, February 26, 2007.

[28] "Phase-field simulation of the partial coalescence cascade between a drop and an interface". Department of Mathematics, University of California, Irvine, January 4, 2007.

[29] "Simulation of bubble growth in polymer foaming". Complex Fluids Seminar, University of British Columbia, September 28, 2006.

[30] "A finite-element phase-field method for simulating interfacial dynamics in complex fluids". Department of Chemical and Biological Engineering, University of British Columbia, October 21, 2005.

[31] "A finite-element phase-field method for simulating interfacial dynamics in complex fluids". Complex Fluids Seminar, University of British Columbia, October 13, 2005.

[32] "A Finite Element Technique for Diffuse-Interface Method Based on Adaptive Unstructured Mesh". IAM Seminar Retreat, University of British Columbia, April 11, 2005.

[33] "A Finite-Element Diffuse-Interface Method for Interfacial Flows with Adaptive Meshing". SCAIM Seminar, University of British Columbia, April 5, 2005.

[34] "Diffuse-Interface Simulations of Drop Coalescence and Retraction in Complex Fluids". Complex Fluids Seminar, University of British Columbia, September 16, 2004.

## GRADUATE STUDENTS

- Current students:
    o Yichen Li
    o Zachary Candelaria
- Former students:
    o John Burleson, MS 2021, instructor at Virginia Tech
    o Jiaqi Zhang, PhD 2020, postdoc at Clemson University
    o Yue Hou (co-advised), PhD 2014

     o   Tong Qin (co-advised), PhD 2012

## REVIEWER OF PEER-REVIEWED JOURNALS

- Acta Mechanica
- Advances in Applied Mathematics and Mechanics
- Advances in Colloid and Interface Science
- Applied Mathematical Modelling
- Applied Mathematics and Computation
- Applied Mathematics Letters
- Applied Sciences
- ASME Journal of Fluids Engineering
- Atmosphere
- Chemical Engineering Science
- Communications in Computational Physics
- Communications in Mathematical Sciences
- Computers & Fluids
- Computational Geosciences
- Computer Methods in Applied Mechanics and Engineering
- Computer Physics Communications
- Computers and Mathematics with Applications
- International Journal of Numerical Analysis and Modeling
- International Journal for Numerical Methods in Fluids
- International Journal of Heat and Mass Transfer
- International Journal of Multiphase Flow
- Journal of Computational Physics
- Journal of Colloid and Interface Sciences
- Journal of Engineering Mathematics
- Journal of Fluid Mechanics
- Journal of Hydrodynamics
- Journal of Non-Newtonian Fluid Mechanics
- Journal of Rheology
- Langmuir
- Mathematical Methods in Applied Sciences
- Microfluidics and Nanofluidics
- npj Microgravity
- Physics of Fluids
- Physical Review Applied
- Physical Review E
- Physical Review Fluids
- Physical Review Letters

- Physical Review Research
- Proceedings of the Royal Society A
- Progress in Computational Fluid Dynamics
- Quarterly Journal of Mechanics and Applied Mathematics
- SIAM Journal on Applied Mathematics
- SIAM Undergraduate Research Online
- The IMA Journal of Applied Mathematics
- Zeitschrift für angewandte Mathematik und Physik (Journal of Applied Mathematis and Physics)

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

- American Physical Society (Division of Fluid Dynamics)
- Society for Industrial and Applied Mathematics
- American Mathematical Society

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