

# Yanxiang Zhao

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## Research Interests

**Computational Mathematics:** numerical analysis, numerical methods for differential equations.

**Mathematical Modeling:** applications to biological chemistry and biological physics.

## Education

**Ph.D.** Department of Mathematics, The Pennsylvania State University, August 2011.

*Advisor:* Professor Qiang Du

**M.S.** Department of Applied Mathematics, Dalian University of Technology, June 2005.

*Advisor:* Professor Renhong Wang

**B.S.** Department of Applied Mathematics, Dalian University of Technology, June 2002.

## Professional Experience

- **Assistant Professor**, Department of Mathematics, the George Washington University, August 2014-present.
- **Postdoc**, Department of Mathematics, University of California, San Diego, September 2011–present.
- **Core Participant** of long program on Materials Defects: Mathematics, Computation, and Engineering, Institute for Pure and Applied Mathematics, September–December 2012.
- **Research Staff**, Department of Biomathematics, University of California, Los Angeles, August 2011.

## Awards

1. Student Chapter Certificate of Recognition, in recognition of students for **outstanding service** and contributions to SIAM Student Chapters, 2011, SIAM.
2. ZZRQ Award, in recognition of a doctoral candidate who **has contributed most to the sense of community** within the Department of Mathematics, 2011, the Pennsylvania State University.
3. Departmental **Graduate Assistant Teaching Award**, 2010, the Pennsylvania State University.
4. Graduate Teaching Associate, 2009, the Pennsylvania State University.
5. University Graduate Fellowship, 2005, the Pennsylvania State University.

## Publications

### *Peer-reviewed Journal Publications*

1. B. Camley, Y. Zhang, **Y. Zhao**, B. Li, E. Ben-Jacob, H. Levine, and W.-J. Rappel, *Polarity mechanisms like contact inhibition of locomotion regulate persistent rotational motion of mammalian cells on micropatterns*, Proc. Natl. Acad. Sci. USA, 2014. (Early edition, September 25, 2014.)
2. T. Banham, B. Li and **Y. Zhao**, *Pattern formation by phase-field relaxation of bending energy with surface-area and volume constrained*, Phys. Rev. E, 90, 033308, 2014.
3. B. A. Camley, **Y. Zhao**, B. Li, H. Levine, and W.-J. Rappel, *Periodic migration in a physical model of cells on micropatterns*, Phys. Rev. Lett. 111, 158102, 2013.

4. **Y. Zhao**, Y.-Y. Kwan, J. Che, B. Li, and J. A. McCammon, *Phase-field approach to implicit solvation of biomolecules with Coulomb-field approximation*, *J. Chem. Phys.*, 139, 024111, 2013. PubMed: PMC3724799.
5. B. Li and **Y. Zhao**, *Variational implicit solvation with solute molecular mechanics: from diffuse-interface to sharp-interface models*, *SIAM J. Appl. Math.*, 73(1),1-23, 2013.
6. **Y. Zhao** and Q. Du, *A diffuse interface model of multi-component vesicle adhesion and fusion*, *Phys. Rev. E*, 84, 011903, 2011.
7. **Y. Zhao**, S. Das and Q. Du, *Adhesion of multi-component vesicle membranes*, *Phys. Rev. E*, 81, 041919, 2010.
8. **Y. Zhao** and R. Wang, *Some problems on the exactness of splines*, *Mathematica Numerica Sinica*, 28(2), 133-140, 2006.

### Publications in Preparation and Others

1. J. Wang, Q. Du, Y. Ma and **Y. Zhao**, *Generalized master equation for some local and nonlocal stochastic processes*, 2013 (in preparation).
2. T. Chou, Q. Du and **Y. Zhao**, *Thermal fluctuation effect on diffuse interface width of vesicle membranes*, preprint, 2013.
3. Q. Du and **Y. Zhao**, *Vesicle membranes with anisotropic elastic bending energy*, preprint, 2013.
4. **Y. Zhao**, *Phase field modeling on multi-component vesicle membranes*, PhD dissertation, Department of Mathematics, The Pennsylvania State University, 2011.

### Teaching Experience

|                                  |   |                          |
|----------------------------------|---|--------------------------|
| <b>Instructor</b>                | University of California, San Diego   | September 2011–present   |
|                                  | <ul style="list-style-type: none"> <li>• Math 20D: Introduction to Differential Equations, Fall 2013.</li> <li>• Math 20B: Calculus II for Science and Engineering, Spring 2013.</li> <li>• Math 20A: Calculus I for Science and Engineering, Fall 2012.</li> <li>• Math 10A: Single Variable Calculus, Winter 2012.</li> </ul> |                          |
| <b>Teaching Associate</b>        | The Pennsylvania State University   | August 2009–May 2011     |
|                                  | <ul style="list-style-type: none"> <li>• Math 250: Ordinary Differential Equations, Spring 2011.</li> <li>• Math 110: Calculus I for Business (recitation class), Fall 2010.</li> <li>• Math 251: Ordinary and Partial Differential Equations, Fall 2009.</li> </ul>  |                          |
| <b>Teaching Assistant</b>        | The Pennsylvania State University   | January 2006–August 2009 |
|                                  | <ul style="list-style-type: none"> <li>• Math 231: Calculus of Several Variables, Spring 2009.</li> <li>• Math 021: College Algebra, Fall 2008.</li> <li>• Math 026: Trigonometry, Fall 2006 and Fall 2007.</li> </ul>  |                          |
| <b>Mentor for undergraduates</b> | Dalian University of Technology   | August 2001–May 2005     |
|                                  | <ul style="list-style-type: none"> <li>• Mentored 60 undergraduate students in Class of 2004 and 2005 in Department of Mathematics.</li> <li>• Provided guidance for college life, and oversaw their social and emotional health.</li> </ul>  |                          |

### Invited Talks

1. Applied and Computational Math Seminar, George Mason University, September 19, 2014.
2. Applied Mathematics Seminar, George Washington University, January 07, 2014.
3. 244th American Chemistry Society National Meeting, Division of Computers in Chemistry, August 21, 2012, Philadelphia.

4. Informal Seminars on Mathematics and Biochemistry-Biophysics, October 06, 2011, University of California, San Diego.
5. Society for Industrial and Applied Mathematics(SIAM)/Mathematical Association of America(MAA) Mid-Atlantic Regional Applied Mathematics Student Conference, April 16, 2011, Shippensburg.
6. SIAM Conference on Computational Science and Engineering, SIAM Student Chapter Presentations, invited talk, March 02, 2011, Reno.
7. SIAM Student Chapter Seminar, September 08, 2010, The Pennsylvania State University.
8. SIAM Conference on the Life Sciences, Minisymposium on Mechanics and Biophysics of Lipid Bilayer Membranes, July 12, 2010, Pittsburgh.
9. SIAM Conference on Mathematical Aspects of Materials Science, Minisymposium on Phase Field Simulation of Interfacial Phenomena, May 25, 2010, Philadelphia.
10. Workshop on Interdisciplinary Mathematics, poster presentation, May 10, 2010, The Pennsylvania State University.

## Professional Activities

1. Strategic Planning - Division of Physical Sciences - Research Subcommittee member, UCSD, February 2013.
2. Reviewer of Nonlinear analysis: Modeling and Control, and Physica D: Nonlinear Phenomena.
3. Founding President of the Pennsylvania State Student Chapter of Society for Industrial and Applied Mathematics, March 2010–December 2010.
4. Volunteer for the weekly Center for Computational Mathematics and Applications Graduate Lunch Seminar, August 2009–December 2010.

## Computational Skills

C, MATLAB, Mathematica.

## Professional Societies

Member of American Mathematical Society (AMS).

Member of Society for Industrial and Applied Mathematics (SIAM).

## References

**Qiang Du** (Ph.D. Advisor)  
 Department of Mathematics  
 The Pennsylvania State University  
 Email: qdu@math.psu.edu

**J. Andrew McCammon**  
 Department of Theoretical Chemistry  
 University of California, San Diego  
 Email: jmccammon@ucsd.edu

**Mary Erickson** (Teaching at PSU)  
 Former First-year Course Coordinator  
 Department of Mathematics  
 The Pennsylvania State University  
 (Currently) Department of Mathematics  
 Northwestern Michigan College  
 Email: merickson@nmc.edu

**Bo Li** (Postdoctoral Supervisor)  
 Department of Mathematics  
 University of California, San Diego  
 Email: bli@math.ucsd.edu

**Wouter-Jan Rappel**  
 Department of Physics  
 University of California, San Diego  
 Email: rappel@physics.ucsd.edu

**John Eggers** (Teaching at UCSD)  
 Department of Mathematics  
 University of California, San Diego  
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