Zecheng Gan

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Positions

Postdoctoral Assistant Professor, University of Michigan, Ann Arbor, 2016-now

Advisor: Prof. Robert Krasny

Education

Ph.D., Applied Mathematics, Shanghai Jiao Tong University, China, 2010-2016

Advisor: Prof. Zhenli Xu

B.S. Mechanical Engineering, Shanghai Jiao Tong University, China, 2006-2010

Research Interests

Scientific computing and applied mathematics for problems arising from soft matter physics, material science and biology. Specifically, fast algorithms for electrostatic interaction in particle-based simulations; effect of dielectric inhomogeneity; nanoparticle self-assembly; structure of electric double layer, etc.

Publications

Preprints

1. Zecheng Gan, Weihua Geng and Robert Krasny, A Boundary Element Method with Extrapolation and Singularity Subtraction for Charged Dielectric Spheres. *(preprint available upon request)*
2. Zecheng Gan, Ziwei Wang, Shidong Jiang, Zhenli Xu and Erik Luijten, Efficient Dynamic Simulations for Charged Dielectric Spheres Through a Novel Hybrid Method. *(preprint available upon request)*
3. Huangfeng Ye, Zecheng Gan, Jae Wan Shim, Bo Kuang and Yanhua Yang, On-node Lattices Construction using Partial Gauss-Hermite Quadrature for the Lattice Boltzmann Method. *Submitted to Chin. Phys. B*

Peer-Reviewed Journal Articles

4. Manman Ma, Zecheng Gan and Zhenli Xu, Ion Structure near Core-Shell Dielectric Nanoparticle. *Phys. Rev. Lett.* 118(7), 076102, 2017
5. Xiaofei Guan, Manman Ma, Zecheng Gan, Zhenli Xu and Bo Li, Hybrid Monte Carlo and Continuum Modeling of Electrolyte with Concentration-Induced Dielectric Variations. *Phys. Rev. E* 94(5), 053312, 2016
6. Zecheng Gan, Shidong Jiang, Erik Luijten and Zhenli Xu, A Hybrid Method for Systems of Closely Spaced Dielectric Spheres and Ions. *SIAM J. Sci. Comput.* 38, B375-B395, 2016
7. Zecheng Gan, Huanxin Wu, Kipton Barros, Zhenli Xu and Erik Luijten, Comparison of Efficient Techniques for the Simulation of Dielectric Objects in Electrolytes. *J. Comp. Phys.* 291, 317-333, 2015
8. Zecheng Gan and Zhenli Xu, Efficient Implementation of the Barnes-Hut Octree Algorithm for Monte Carlo Simulations of Charged Systems. *Sci. China Math.* 57(7), 1331-1340, 2014
9. Zecheng Gan, Xiangjun Xing and Zhenli Xu, Effects of Image Charges, Interfacial Charge Discreteness, and Surface Roughness on the Zeta Potential of Spherical Electric Double Layers. *J. Chem. Phys.* 137(3), 034708, 2012
10. Zecheng Gan and Zhenli Xu, Multiple-image Treatment of Induced Charges in Monte Carlo Simulations of Electrolytes Near a Spherical Dielectric Interface. *Phys. Rev. E* 84(1), 016705, 2011

Work in Preparing

11. with Weihua Geng and Robert Krasny, A Boundary Element Method for Dynamics Simulation of Multiple Dielectric Interfaces.
12. with Ziwei Wang, Shidong Jiang, Zhenli Xu and Erik Luijten, Phase Behavior and Structure of Charged Dielectric Sphere Mixtures.
13. with Shidong Jiang and Zhenli Xu, An $\mathcal{O}(N)$ Algorithm for Plasmonic Interaction between Nanospheres.

Conference and Workshop Presentations

SIAM Conference on Computational Science and Engineering, , Washington, USA, 2019.2

AMS Fall Central Sectional Meeting, UMich, USA, 2018.10

SIAM Annual Conference 2018, Portland, USA, 2018.7

The 2018 MICDE Symposium - Computation: A Pillar of Science and a Lens to the Future (poster), Umich, USA, 2018.3

The 14th Annual Conference on Frontiers in Applied and Computational Mathematics, NJIT, USA, 2017.6

The 2017 MICDE Symposium - The New Era of Data-Enabled Computational Science (poster), Umich, USA, 2017.4

SIAM Conference on Computational Science and Engineering (poster), Atlanta, USA, 2017.2

The International Congress on Industrial and Applied Mathematics (poster), Beijing, China, 2015.8

The 1st INS-ZY Student Conference On Natural Sciences, Shanghai, China, 2015.4

10th Conference on Computational Sciences and Engineering, Shanghai, China, 2014.12

9th National Physics Conference on Soft Matter and Life Science, Wenzhou, China, 2014.11

Frontiers of Soft Matter Physics: from Non-equilibrium Dynamics to Active Matter (poster), Hong Kong, 2014.01

9th Conference on Computational Sciences and Engineering, ECUST, Shanghai, China, 2013.11

Workshop on Computational Challenges in Complex Charged Systems, Shanghai, China, 2013.09

Workshop on Monte Carlo Methods in the Physical and Biological Sciences (poster), ICERM, Brown University, USA, 2012.10

Workshop and Summer School on Coulomb Many-body Systems (poster), Shanghai, China, 2012.06

Seminar Talks

BIE methods for the Electrostatics in Biomolecule Simulations, INS, SJTU, 2017.7

BIM for the Electrostatics in Biomolecule Simulations, math department, TJU, 2017.7

New Faculty Capsule Research Talk, Department of Mathematics, UMich, 2016.8

Dielectric Effect in Charged Soft Matter Systems, NVIDIA Webinar Series, NVIDIA, 2016.6

Hybrid Method for Solving Electrostatics in Systems of Densely Packed Dielectric Spheres and Ions, Department of Mathematics, University of Michigan, 2015.12

Self-assembly Structure of Binary Dielectric Colloidal NPs, CSML, NU, 2015.11

Fast Algorithms for Solving the Poisson's Equation with Close Compacted Dielectric Spheres and Ions, Computational Soft Matter Lab, Northwestern University, 2015.10

9th Doctoral Forum of Shanghai Jiao Tong University (Best Report Award), 2012.05

Topical Review on Enhanced Sampling Monte Carlo algorithms, SJTU, 2012.02-2012.05

Teaching Experience

University of Michigan

Instructor, Math 156 (Applied Honors Calculus II): Fall 2018

Instructor, Math 286 (Honors Differential Equations): Fall 2017

Instructor, Math 285 (Honors Calculus III): Winter 2017

Instructor, Math 115 (Calculus I): Fall 2016

Instructor, Umich Math Lab: Fall 2016

Instructor, Umich Math Circle: Creative Combinatorics I & II, October 2016

Shanghai Jiao Tong University

TA, Computational Statistics: Spring 2012, Spring 2014

Co-instructor, Probability and Statistics: Spring 2013, Fall 2013

TA, Scientific Computing: Fall 2011

TA, Calculus: Spring 2011

TA, Linear Algebra: Fall 2010

Services

Chair for session "Computational Electromagnetics", SIAM Conference on Computational Science and Engineering , Washington, USA, 2019.2

Journal referee for: *Frontiers in Applied Mathematics and Statistics*.

Professional Memberships

Member, Society for Industrial and Applied Mathematics, 2017–Present.

Selected Honors

National Scholarship, Ministry of Education, China, 2014-2015

***AMD* High Performance Computing Scholarship**, HPC Center of Shanghai Jiao Tong University, 2013-2014

Postgraduate Academic Excellence Scholarship, Shanghai Jiao Tong University, 2012-2013

The *Cyrus Tang* Foundation Scholarship, Shanghai Jiao Tong University, 2006-2010