

CURRICULUM VITAE

Siwen Wang

Contact Information

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Education

Ph.D., Mathematics, University of Alabama, (Aug. 2015- May 2021).

- Core Courses: Real Analysis, Numerical Analysis, Numerical Linear Algebra, Optimization Theory, PDE, Statistics
- GPA: 3.89/4.0

B.Sc., Information and Computing Science, Huazhong Agriculture University, China, (Aug. 2011-May 2015)

- Core Courses: Mathematical Analysis, Advanced Algebra, ODE, Statistics, Numerical Research, Data Analysis, C++, JAVA
- GPA: 3.51/4.0
- Major Ranking: 1/71

Research Interests

- Mathematical Biology: Mathematical methods for molecular biology; Implicit Solvent models; Biomolecular Solvation Analysis; PDE modeling of Molecular Surface.
- Numerical Methods: Regularization methods; High order Finite Difference methods; Immersed Interface methods; Matched Interface and Boundary (MIB) methods; Alternating Direction Implicit (ADI) methods.
- Data Science: Data Analysis, Mathematical Modeling, Machine Learning, Statistical Inferences, Data Visualization.

Skills

- Programming languages: Python, Fortran, MATLAB, Java, JavaScript, SQL, C++, bash
- Technologies: Tableau, Git, NumPy, Pandas, scikit-learn
- Specialization: Numerical Modeling, Statistical Inference, Machine Learning
- Certificates: Udacity Data Analyst Nanodegree

Professional Experiences

- Teaching Assistant, Department of Mathematics, University of Alabama, (Aug. 2015- Current).
- Research Assistant, Department of Mathematics, University of Alabama, (Aug. 2019- June 2020).
- Math Tutor, ENGenuity Lab, University of Alabama, (Aug. 2017- Nov. 2017).

Activities

- Graduate Secretary of NSF-CBMS Conference: Mathematical Molecular Bioscience and Biophysics in University of Alabama, (May 13 - 17, 2019)
- Volunteer for 2019 MATHCOUNTS West Alabama Regional Competition in University of Alabama, (Feb 23, 2019)
- Volunteer for Graduate Recruiting Fair at the Joint Math Meeting (JMM) in Baltimore, (Jan 16-19, 2019)

Research Projects

- NSF Supported Project (DMS-1812930):
 - Goals: Propose new numerical treatments on capturing the singularity in Poisson-Boltzmann equations (PBE).
 - Processes: Modeled the whole algorithm for solving targeted question, including protein structure generating, formulation testing, regression modeling and forecasting on calculating the electrostatic free energies.
 - Results: New methods were built for solving PBE, with several papers published. All formulations and algorithms were constructed into one Fortran package for academic use. Main code was achieved in Fortran. Pandas and Seaborn in Python were used for data manipulation and visualization.
- NSF Supported Project (DMS-1318898):
 - Main Work: Developed Matched Alternating Direction Implicit (ADI) schemes for solving the nonlinear Poisson-Boltzmann equation with complex dielectric interfaces.

Courses Taught

- MATH 237: Introduction to Linear Algebra, (Jan. 2021-May 2021)
- MATH 110: Finite Mathematics, (Aug 2020- Dec 2020)
- MATH 237: Introduction to Linear Algebra, (Aug 2018- May 2019)
- MATH 113: Pre-Calculus Trigonometry, (Jan 2018- May 2018)
- MATH 112: Pre-Calculus Algebra, (Aug 2017- May 2017)

Conferences

- Annual Symposium of Southeast Center for Mathematics and Biology in Atlanta, (Feb.17-18, 2020).
- CBMS Conference: Mathematical Molecular Bioscience and Biophysics in Tuscaloosa, (May 2019).
- Workshop of Scientific Computing meets Machine Learning and Life Sciences in Lubbock, (Oct. 7-9, 2019).
- CBMS Conference: Mathematical Molecular Bioscience and Biophysics in Tuscaloosa, (May 2019).
- Joint Mathematics Meetings, Baltimore Convention Center in Baltimore, (Jan 2019).
- Annual Joint Applied Math Meeting, University of Alabama in Huntsville, (Sep 2018).

- Workshop on the Mathematics of Drug Design/Discovery, The Field Institute in Toronto, (Jun 2018).
- The second Annual Meeting of SIAM Central States Section, University of Arkansas at Little Rock, (Oct 2016).

Awards and Honors

- Graduate Student Research and Travel Fund, University of Alabama, (Jan 2019/Mar 2018/Sep 2016).
- Honorable Mention in Mathematical Contest in Modeling, (Feb 2014).
- Third prize of Hubei in China Undergraduate Mathematical Contest in Modeling, Huazhong Agriculture University, (Sep 2013).
- Outstanding Student Scholarship, Huazhong Agriculture University, (2012-2013 Academic year).

Preprints and Publications

- S. Wang, Y. Shao, E. Alexov, and S. Zhao, A regularization approach for solving the super-Gaussian Poisson-Boltzmann model with heterogeneous dielectric functions, in preparation, (2021)
- Y. Shao, M. McGowan, S. Wang, E. Alexov, and S. Zhao, Convergence of a diffuse interface Poisson-Boltzmann (PB) model to the sharp interface PB model: a unified regularization formulation, Applied Mathematics and Computation, submitted, (2021)
- S. Wang, E. Alexov, and S. Zhao, on regularization of charge singularities in solving the Poisson-Boltzmann equation with a smooth solute-solvent boundary, Mathematical Biosciences and Engineering, vol. 18, s2: 1370-1405, (2021)
- S. Wang, A. Lee, E. Alexov, and S. Zhao, A regularization approach for solving Poisson's equation with singular charge sources and diffuse interfaces, Applied Mathematics Letters, 102, 106144, (2020)
- B. Jones, S. Ahmed Ullah, S. Wang, and S. Zhao, Adaptive pseudo-time methods for the Poisson-Boltzmann equation with Eulerian solvent excluded surface, Communications in Information & Systems, Vol. 21, No. 1, pp. 85-123, (2021)
- T. Hazra, S. Ahmed-Ullah, S. Wang, E. Alexov, and S. Zhao, A super-Gaussian Poisson-Boltzmann model for electrostatic solvation free energy calculation: smooth dielectric distribution for protein cavities and in both water and vacuum states, Journal of Mathematical Biology, 79, 631-672, (2019)
- G. Nie, Y. Li, F. Wang, S. Wang, and H. Hu, A novel fractal approach for predicting G-protein-coupled receptors and their subfamilies with support vector machines, Bio-Medical Materials and Engineering, vol. 26, no. s1, pp. S1829-S1836, (2015)