

Xiaoming He

Curriculum Vitae

Department of Mathematics and Statistics
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Education

Ph.D. in Mathematics; Virginia Tech (08/05—05/09).
Advisor: Prof. Tao Lin.

M. S. in Mathematics; Virginia Tech (08/05—05/07).
Advisor: Prof. Tao Lin.

M. S. in Computational Mathematics; Sichuan University (08/02—06/05).
Advisor: Prof. Tao Lü.

B. S. in Computational Mathematics; Sichuan University (08/98—06/02).

Positions

Associate Professor; Department of Mathematics and Statistics, Missouri University of Science and Technology (09/16–08/21).

Assistant Professor; Department of Mathematics and Statistics, Missouri University of Science and Technology (09/10–08/16).

Postdoctoral research associate (supervised by Prof. Max Gunzburger); Department of Scientific Computing, Florida State University (05/09—08/10).

Research Interests

- Interface problems, computational fluid dynamics, data assimilation, boundary integral equations, feedback control, stochastic PDEs
- Finite element methods, domain decomposition methods, lattice Boltzmann methods, extrapolations
- Computational plasma physics (Particle-In-Cell method)

Award and Fellowship

- Faculty Research Award, Missouri University of Science and Technology, 2019.
- Humboldt Research Fellowship for Experienced Researchers, 2018.
- Faculty Research Award, Missouri University of Science and Technology, 2014.

Funding

- National Science Foundation, DMS-2111039, “Collaborative Research: Lab-data-enabled modeling, numerical methods, and validation for a three-dimensional interface inverse problem for plasma-material interactions”, August 2021 - July 2024, Daoru Han (PI) and Xiaoming He (co-PI), total amount for Missouri University of Science and Technology: \$169,156, shared credit 30%. (The collaborative NSF grant for this collaborative research: DMS-2110833, Xu Zhang (PI), Oklahoma State University (leading institute of this collaborative research))
- National Science Foundation, DMS-1818642, “Collaborative Research: Models, algorithms, simulations, and applications for two-phase ferrofluid flows in contact with a solid surface”, August 2018 - July 2021, Xiaoming He (PI) and Cheng Wang (Co-PI), total amount for Missouri University of Science and Technology (leading institute of this collaborative research): \$160,000, shared credit 70%. (The collaborative NSF grant for this collaborative research: DMS-1818783, Xiaofeng Yang (PI), University of South Carolina)
- National Science Foundation, DMS-1722647, “Collaborative Research: Data-enabled modeling, numerical method, and data assimilation for coupling dual porosity flow with free flow”, August 2017 - July 2021, Xiaoming He (PI), Baojun Bai (Co-PI), and Mingzhen Wei (Co-PI), total amount for Missouri University of Science and Technology (leading institute of this collaborative research): \$180,000, shared credit 70%. (The collaborative NSF grant for this collaborative research: DMS-1722692, Craig Douglas (PI), University of Wyoming)
- National Science Foundation, DMS-1418624, “Non-Iterative Multi-Physics Domain Decomposition Method for the Navier-Stokes-Darcy Model”, September 2014 - August 2017, Xiaoming He (PI) and Mingzhen Wei (Co-PI), total amount: \$95,500, shared credit 80%.
- Department of Energy, DE-FE0009843, “Robust Ceramic Coaxial Cable Down-Hole Sensors for Long-Term in Situ Monitoring of Geologic CO₂ Injection and Storage”, October 2012 - June 2016, Runar Nygaard (PI), Hai Xiao (Co-PI), and Xiaoming He (Co-PI), total amount: \$1,447,193, sponsor amount: \$1,156,668, shared credit 30%.
- National Science Foundation, DMS-2023264, “Midwest Numerical Analysis Day 2020”, April 2020 - March 2022, Xiaoming He (PI) and Jue Yan (Co-PI), total amount: \$5,000.
- NASA-EPSCoR, “PIFE-PIC: A 3D Parallel Immersed-Finite-Element Particle-in-Cell Framework for Kinetic Modeling of Plasma-Material Interaction”, Daoru Han (PI) and Xiaoming He (Co-PI), October 2017 - September 2018, total amount: \$20,000, shared credit 50%.
- Simons Foundation, Collaboration Grant for Mathematicians, “Numerical Methods and Mathematical Analysis for Interface Problems”, September 2014 - August 2019, Xiaoming He (PI), total amount: \$35,000. (This grant needs to be returned to Simons Foundation before September 2015 since the PI is funded by NSF)
- Department of Transportation, “NUTC/Reliability-based Optimization Design of Geosynthetic Reinforced Road Embankment”, May 2013 - December 2013, Ronaldo Luna (PI) and Xiaoming He (Co-PI), total amount: \$16,052, shared credit 50%.
- AMS-Simons Travel Grant, July 2012 - June 2014, Xiaoming He (PI), total amount: \$4,800.
- University of Missouri, Course Sharing Grant “Finite Element Methods II”, May 2018 - May 2019, Xiaoming He (PI), total amount: \$9,731.

- Missouri Research Board Grant, “Coupling dual porosity flow with free flow: modeling, numerical method, and data assimilation”, Xiaoming He (PI), January 2017 - January 2018, total amount: \$11,200.
- Missouri Interdisciplinary Intercampus Research Grant, “Development and Application of a Hybrid Material Point and Immersed Finite Element Method (MPM-IFE) to Soil-Water Flow Modeling Considering Hydrophobicity”, Zhiqiang Chen (PI for UMKC), Xiaoming He (PI for Missouri S&T), August 2015 - July 2016, total amount: \$59,399, amount for Missouri S&T: \$25,000.
- Missouri Research Board Grant, “Novel Numerical Methods for a Moving Interface Problem”, Xiaoming He (PI), August 2014 - July 2015, total amount: \$10,000.
- University of Missouri, Course Sharing Grant and Educational Research Grant for “Mathematical Foundation of Finite Element Methods”, August 2014 - May 2015, Xiaoming He (PI), total amount: \$12,501.
- Missouri Research Board Grant, “Parallel Numerical Methods for Realistic Coupled Stokes-Darcy Model”, Xiaoming He (PI), January 2011 - January 2012, total amount: \$13,000.

Editor

- Associate editor, International Journal of Numerical Analysis & Modeling, 2016-present.
- Associate editor, International Journal of Numerical Analysis & Modeling, Series B, 2013-2015.
- Guest editor, the special issue of *Applied Numerical Mathematics* for the 20th IMACS World Congress.
- Guest editor, the special issue of *Discrete and Continuous Dynamical Systems - Series B* for SIAM Central States Section.
- Managing guest editor, the special issue of *Computers and Mathematics with Applications* for the 2nd Annual Meeting of SIAM Central States Section.
- Managing guest editor, the special issue of *Journal of Computational and Applied Mathematics* for the 1st Annual Meeting of SIAM Central States Section.
- Guest editor, the special issue of *International Journal of Numerical Analysis and Modeling* for 2013 International Conference on Engineering and Computational Mathematics.

Journal Publications

1. Daoru Han, Xiaoming He, David Lund, and Xu Zhang. PIFE-PIC: Parallel Immersed-Finite-Element Particle-in-Cell for 3-D kinetic simulations of plasma-material interactions, *SIAM Journal on Scientific Computing*, accepted for publication, 2021.
2. Guodong Zhang, Xiaoming He, and Xiaofeng Yang. Decoupled, linear, and unconditionally energy stable fully-discrete finite element numerical scheme for a two-phase ferrohydrodynamics model, *SIAM Journal on Scientific Computing*, 43(1): B167-B193, 2021.
3. Jinwei Bai, Yong Cao, Xiaoming He, and Peng E. An implicit particle-in-cell model based on anisotropic immersed-finite-element method, *Computer Physics Communications*, 261: #107655, 2021.

4. Xinpeng Wei, Jianxun Zhao, Xiaoming He, Zhen Hu, Xiaoping Du, and Daoru Han. Adaptive Kriging method for uncertainty quantification of the photoelectron sheath and dust levitation on the lunar surface, *Journal of Verification, Validation and Uncertainty Quantification*, 6(1): #011006, 2021.
5. Yingzhi Liu, Yinnian He, Xuejian Li, and Xiaoming He. A novel convergence analysis of Robin-Robin domain decomposition method for Stokes-Darcy system with Beavers-Joseph interface condition, *Applied Mathematics Letters*, 119: #107181, 2021.
6. Daozhi Han, Xiaomin He, Quan Wang, and Yanyun Wu. Existence and weak-strong uniqueness of solutions to the Cahn-Hilliard-Navier-Stokes-Darcy system in superposed free flow and porous media, *Nonlinear Analysis*, 211: #112411, 2021.
7. Hongyan Liu, Jin Huang, and Xiaoming He. Bivariate barycentric rational interpolation method for two dimensional fractional Volterra integral equations, *Journal of Computational and Applied Mathematics*, 389: #113339, 2021.
8. Md. Abdullah Al Mahbub, Xiaoming He, Nasrin Jahan Nasu, Changxin Qiu, Yifan Wang, and Haibiao Zheng. A coupled multi-physics model and a decoupled stabilized finite element method for closed-loop geothermal system, *SIAM Journal on Scientific Computing*, 42(4): B951-B982, 2020.
9. Changxin Qiu, Xiaoming He, Jian Li, and Yanping Lin. A domain decomposition method with Lagrange multipliers and implicit schemes for the time-dependent Navier-Stokes-Darcy model with defective boundary condition, *Journal of Computational Physics*, 411: #109400, 2020.
10. Chang Lu, Jie Wan, Yong Cao, and Xiaoming He. A fully decoupled iterative method with three-dimensional anisotropic immersed finite elements for Kaufman-type discharge problems, *Computer Methods in Applied Mechanics and Engineering*, 372: #113345, 2020.
11. Hongtao Liu, Feng Shi, Jie Wan, Xiaoming He, and Yong Cao. Discrete unified gas kinetic scheme for a reformulated BGK-Vlasov-Poisson system with a wide range of Knudsen number and normalized Debye length, *Computer Physics Communications*, 255: #107400, 2020.
12. Chang Lu, Zhi Yang, Jinwei Bai, Yong Cao, and Xiaoming He. Three-dimensional immersed finite element method for anisotropic magnetostatic/electrostatic interface problems with non-homogeneous flux jump, *International Journal for Numerical Methods in Engineering*, 121(10): 2107-2127, 2020.
13. Xiaoming He, Nan Jiang, and Changxin Qiu, An artificial compressibility ensemble algorithm for a stochastic Stokes-Darcy model with random hydraulic conductivity and interface conditions, *International Journal for Numerical Methods in Engineering*, 121(4): 712-739, 2020.
14. Rui Li, Yali Gao, Jie Chen, Li Zhang, Xiaoming He, and Zhangxin Chen. Discontinuous finite volume element method for a coupled Navier-Stokes-Cahn-Hilliard phase field model, *Advances in Computational Mathematics*, 46: #25, 2020.
15. Yanan Xing, Lina Song, Xiaoming He, and Changxin Qiu. A generalized finite difference method for solving elliptic interface problems, *Mathematics and Computers in Simulation*, 178: 109-124, 2020.

16. Feng Bai, Daozhi Han, Xiaoming He, and Xiaofeng Yang. Deformation and coalescence of ferrodroplets in Rosensweig model using the phase field and modified level set approaches under uniform magnetic fields, *Communications in Nonlinear Science and Numerical Simulation*, 85: #105213, 2020.
17. Guodong Zhang, Xiaoming He, and Xiaofeng Yang. Fully decoupled, linear and unconditionally energy stable time discretization scheme for solving the magneto-hydrodynamic equations, *Journal of Computational and Applied Mathematics*, 369: #112636, 2020.
18. Jinjin Yang, Shipeng Mao, Xiaoming He, Xiaofeng Yang, and Yinnian He. A diffuse interface model and semi-implicit energy stable finite element method for two-phase magnetohydrodynamics flows, *Computer Methods in Applied Mechanics and Engineering*, 356: 435-464, 2019.
19. Guodong Zhang, Xiaoming He, and Xiaofeng Yang. A fully decoupled, linear and unconditionally energy stable scheme with finite element discretization for magneto-hydrodynamic equations, *Journal of Scientific Computing*, 81: 16781711, 2019.
20. Md. Abdullah Al Mahbub, Xiaoming He, Nasrin Jahan Nasu, Changxin Qiu, and Haibiao Zheng. Coupled and decoupled stabilized mixed finite element methods for non-stationary dual-porosity-Stokes fluid flow model, *International Journal for Numerical Methods in Engineering*, 120(6): 803-833, 2019.
21. Yandong Zhang, Chuanle Zhou, Chuang Qu, Mingzhen Wei, Xiaoming He, and Baojun Bai. Fabrication and verification of a glass-silicon-glass micro-/nanofluidic model for investigating multi-phase flow in shale-like unconventional dual-porosity tight porous media, *Lab on a Chip*, 19: 4071-4082, 2019.
22. Xiaofeng Yang, Guodong Zhang, and Xiaoming He. Convergence analysis of an unconditionally energy stable projection scheme for magneto-hydrodynamic equations, *Applied Numerical Mathematics*, 136: 235-256, 2019.
23. Fubiao Lin, Xiaoming He, and Xiaoxia Wen. Fast, unconditionally energy stable large time stepping method for a new Allen-Cahn type square phase-field crystal model, *Applied Mathematics Letters*, 98: 248-255, 2019.
24. Chen Xu, Chuanjun Chen, Xiaofeng Yang, and Xiaoming He. Numerical approximations for the hydrodynamics coupled binary surfactant phase field model: second order, linear, unconditionally energy stable schemes, *Communications in Mathematical Sciences*, 17(3): 835-858, 2019.
25. Jin Lu, Botao Zhou, Md. Motiur Rahman, and Xiaoming He. New solution to the pressure transient equation in a two-layer reservoir with crossflow, *Journal of Computational and Applied Mathematics*, 362: 680-693, 2019.
26. Max Gunzburger, Xiaoming He, and Buyang Li. On Ritz projection and multi-step backward differentiation schemes in decoupling the Stokes-Darcy model, *SIAM Journal on Numerical Analysis*, 56(1): 397-427, 2018.
27. Yali Gao, Xiaoming He, Liquan Mei, and Xiaofeng Yang. Decoupled, linear, and energy stable finite element method for the Cahn-Hilliard-Navier-Stokes-Darcy phase field model, *SIAM Journal on Scientific Computing*, 40(1): B110-B137, 2018.

28. Xiaoming He, Weiwei Hu, and Yangwen Zhang. Observer based feedback boundary stabilization of the Navier-Stokes equation, *Computer Methods in Applied Mechanics and Engineering*, 339(1): 542-556, 2018.
29. Daoru Han, Joseph Wang, and Xiaoming He. Immersed-finite-element particle-in-cell simulations of plasma charging at lunar terminator, *Journal of Spacecraft and Rockets*, 55(6): 1490-1497, 2018.
30. Huijun Cao, Yong Cao, Yuchuan Chu, Xiaoming He, and Tao Lin. A Huygens immersed-finite-element particle-in-cell method for modeling plasma-surface interactions with moving interface, *Communications in Nonlinear Science and Numerical Simulation*, 59: 132-148, 2018.
31. Jinwei Bai, Yong Cao, Xiaoming He, Hongyan Liu, and Xiaofeng Yang. Modeling and an immersed finite element method for an interface wave equation, *Computers and Mathematics with Application*, 76(7): 1625-1638, 2018.
32. Rui Li, Jian Li, Xiaoming He, and Zhangxin Chen. A stabilized finite volume element method for a coupled Stokes-Darcy problem, *Applied Numerical Mathematics*, 133: 2-24, 2018.
33. Qiumei Huang, Xiaofeng Yang and Xiaoming He. Numerical approximations for a smectic-A liquid crystal flow model: first-order, linear, decoupled and energy schemes, *Discrete and Continuous Dynamical Systems - Series B*, 23(6): 2177-2192, 2018.
34. Xiaofeng Yang, Jia Zhao, and Xiaoming He. Linear, second order and unconditionally energy stable schemes for the viscous Cahn-Hilliard equation with hyperbolic relaxation using the invariant energy quadratization method, *Journal of Computational and Applied Mathematics*, 343(1):80-97, 2018.
35. Feng Bai, Xiaoming He, Xiaofeng Yang, Ran Zhou, and Cheng Wang. Three dimensional phase-field investigation of droplet formation in microfluidic flow focusing devices with experimental validation, *International Journal of Multiphase Flow*, 93: 130-141, 2017.
36. Yuchuan Chu, Daoru Han, Yong Cao, Xiaoming He, and Joseph Wang. An immersed-finite-element particle-in-cell simulation tool for plasma surface interaction, *International Journal of Numerical Analysis and Modeling*, 14(2): 175-200, 2017.
37. Jiangyong Hou, Meilan Qiu, Xiaoming He, Chaohua Guo, Mingzhen Wei, and Baojun Bai. A dual-porosity-Stokes model and finite element method for coupling dual-porosity flow and free flow, *SIAM Journal on Scientific Computing*, 38(5): B710-B739, 2016.
38. Daoru Han, Pu Wang, Xiaoming He, Tao Lin, and Joseph Wang. A 3D immersed finite element method with non-homogeneous interface flux jump for applications in particle-in-cell simulations of plasma-lunar surface interactions, *Journal of Computational Physics*, 321: 965-980, 2016.
39. Daoru Han, Joseph Wang, and Xiaoming He. A non-Homogeneous immersed-finite-element particle-in-cell method for modeling dielectric surface charging in plasmas, *IEEE Transactions on Plasma Science*, 44(8):1326-1332, 2016.
40. John A. Burns, Xiaoming He, and Weiwei Hu. Feedback stabilization of a thermal fluid system with mixed boundary control, *in honor of Max Gunzburger's 70th birthday*, *Computers and Mathematics with Application*, 71(11): 2170-2191, 2016.

41. Xiaoming He, Jian Li, Yanping Lin, and Ju Ming. A domain decomposition method for the steady-state Navier-Stokes-Darcy model with Beavers-Joseph interface condition, *SIAM Journal on Scientific Computing*, 37(5): S264-S290, 2015.
42. Yong Cao, Yuchuan Chu, Xiaoming He, and Tao Lin. An iterative immersed finite element method for an electric potential interface problem based on given surface electric quantity, *Journal of Computational Physics*, 281: 82-95, 2015.
43. Honghua Jian, Yuchuan Chu, Huijun Cao, Yong Cao, and Xiaoming He. Three-dimensional IFE-PIC numerical simulation of background pressure's effect on accelerator grid impingement current for ion optics, *Vacuum*, 116: 130-138, 2015.
44. Chong Chen, Xiaoming He, and Jin Huang. Mechanical quadrature methods and their extrapolations for solving the first kind boundary integral equations of Stokes equation, *Applied Numerical Mathematics*, 96: 165-179, 2015.
45. Chaolang Hu, Xiaoming He, and Tao LLü. Euler-Maclaurin expansions and approximations of hypersingular integrals, *Discrete and Continuous Dynamical Systems C Series B*, 20(5): 1355-1375, 2015.
46. Yanzhao Cao, Max Gunzburger, Xiaoming He, and Xiaoming Wang. Parallel, non-iterative, multi-physics domain decomposition methods for time-dependent Stokes-Darcy systems, *Mathematics of Computation*, 83(288): 1617-1644, 2014.
47. Xiaoming He, Tao Lin, and Yanping Lin. A selective immersed discontinuous Galerkin method for elliptic interface problems, *Mathematical Methods in the Applied Sciences*, 37(7): 983-1002, 2014.
48. Wenqiang Feng, Xiaoming He, Yanping Lin, and Xu Zhang. Immersed finite element method for interface problems with algebraic multigrid solver, *Communications in Computational Physics*, 15(4): 1045-1067, 2014.
49. Chaolang Hu, Jing Lu, and Xiaoming He. Numerical solutions of a hypersingular integral equation with application to productivity formulae of horizontal wells producing at constant wellbore pressure, *International Journal of Numerical Analysis and Modeling-Series B*, 5(3): 269-288, 2014.
50. Yong Cao, Yuchuan Chu, Xiaoming He, and Mingzhen Wei. Decoupling the stationary Navier-Stokes-Darcy system with the Beavers-Joseph-Saffman interface condition, *Abstract and Applied Analysis*, vol. 2013, Article ID 136483, 10 pages, 2013.
51. Xiaoming He, Tao Lin, Yanping Lin, and Xu Zhang. Immersed finite element methods for parabolic equations with moving interface, *Numerical Methods for Partial Differential Equations*, 29(2): 619-646, 2013.
52. Chaolang Hu, Jing Lu, and Xiaoming He. Productivity formulae of an infinite-conductivity hydraulically fractured well producing at constant wellbore pressure based on numerical solutions of a weakly singular integral equation of the first kind, *Mathematical Problems in Engineering*, vol. 2012, Article ID 428596, 18 pages, 2012.
53. Wenqiang Feng, Xiaoming He, Zhu Wang, and Xu Zhang. Non-iterative domain decomposition methods for a non-stationary Stokes-Darcy model with Beavers-Joseph interface condition, *Applied Mathematics and Computation*, 219(2): 453-463, 2012.

54. Xiaoming He, Tao Lin, and Yanping Lin. The convergence of the bilinear and linear immersed finite element solutions to interface problems, *Numerical Methods for Partial Differential Equations*, 28(1): 312-330, 2012.
55. Jin Huang, Guang Zeng, Xiaoming He, and Zicai Li. Splitting extrapolation algorithms for first kind boundary integral equations with singularities by mechanical quadrature methods, *Advances in Computational Mathematics*, 36(1): 79-97, 2012.
56. Yanzhao Cao, Max Gunzburger, Xiaoming He, and Xiaoming Wang. Robin-Robin domain decomposition methods for the steady-state Stokes-Darcy system with the Beaver-Joseph interface condition, *Numerische Mathematik*, 117: 601-629, 2011.
57. Yuchuan Chu, Yong Cao, Xiaoming He, and Min Luo. Asymptotic boundary conditions for two-dimensional electrostatic field problems with immersed finite elements, *Computer Physics Communications*, 182(11): 2331-2338, 2011.
58. Huilei Han, Xiaoming He, Yaping Liu, and Tao Lü. Extrapolation for solving system of weakly singular nonlinear Volterra integral equations of the second kind, *International Journal of Computer Mathematics*, 88(16): 3507-3520, 2011.
59. Xiaoming He, Tao Lin, and Yanping Lin. Immersed finite element methods for elliptic interface problems with non-homogeneous jump conditions, *International Journal of Numerical Analysis and Modeling*, 8(2): 284-301, 2011.
60. Yong Cao, Xiaoming He, and Tao Lü. An algorithm using finite volume element method and its splitting extrapolation for second-order elliptic problems, *Journal of Computational and Applied Mathematics*, 235(13): 3734-3742, 2011.
61. Xiaoming He, Tao Lin, and Yanping Lin. Interior penalty bilinear IFE discontinuous Galerkin methods for elliptic equations with discontinuous coefficient, *dedicated to Professor David Russell on the occasion of his 70th birthday*, *Journal of Systems Science and Complexity*, 23(3):467-483, 2010.
62. Lu Pan, Xiaoming He, and Tao Lü. High accuracy combination methods for solving the systems of nonlinear Volterra integral and integro-differential equations with weakly singular kernels of the second kind, *Mathematical Problems in Engineering*, vol. 2010, Article ID 901587, 21 pages, 2010.
63. Xiaoming He and Tao Lü. A finite element splitting extrapolation for second order hyperbolic equations, *SIAM Journal on Scientific Computing*, 31(6):4244-4265, 2009.
64. Yong Cao, Xiaoming He, and Tao Lü. A splitting extrapolation for solving nonlinear elliptic equations with d-quadratic finite elements, *Journal of Computational Physics*, 228(1):109-122, 2009.
65. Xiaoming He, Tao Lin, and Yanping Lin. A bilinear immersed finite volume element method for the diffusion equation with discontinuous coefficient, *dedicated to Professor Richard E. Ewing on the occasion of his 60th birthday*, *Communications in Computational Physics*, 6(1):185-202, 2009.
66. Joseph Wang, Xiaoming He, and Yong Cao. Modeling electrostatic levitation of dust particles on lunar surface, *IEEE Transactions on Plasma Science*, 36(5):2549-2466, 2008.

67. Xiaoming He, Tao Lin, and Yanping Lin. Approximation capability of a bilinear immersed finite element space, *Numerical Methods for Partial Differential Equations*, 24(5):1265-1300, 2008.
68. Xiaoming He and Tao Lü. Splitting extrapolation method for solving second-order parabolic equations with curved boundaries by using domain decomposition and d-quadratic isoparametric finite elements, *International Journal of Computer Mathematics*, 84(6):767-781, 2007.

Conference Publications

1. Jianxun Zhao, Xinpeng Wei, Xiaoming He, Daoru Han, and Xiaoping Du. Fully-kinetic particle-in-cell simulations of photoelectron sheath on uneven lunar surface, #AIAA – 2021 – 1433, *AIAA Scitech 2021 Forum*, Virtual Conference, January 11-15, 2021.
2. Jianxun Zhao, Xinpeng Wei, Zhangli Hu, Xiaoming He, and Daoru Han. Photoelectron sheath near the lunar surface: fully kinetic modeling and uncertainty quantification analysis, #AIAA – 2020 – 1548, *AIAA Scitech 2020 Forum*, Orlando, Florida, January 6-10, 2020.
3. Craig Douglas, Xiukun Hu, Baojun Bai, Xiaoming He, Mingzhen Wei, Jiangyong Hou. A data assimilation enabled model for coupling dual porosity flow with free flow, DOI: 10.1109/DCABES.2018.00085, *17th International Symposium on Distributed Computing and Applications for Business Engineering and Science (DCABES)*, Wuxi, China, October 19-23, 2018.
4. Daoru Han, Xiaoming He, Joseph Wang. PIFE-PIC: A 3-D parallel immersed finite element particle-in-cell framework for plasma simulations, #AIAA – 2018 – 2196, *2018 AIAA Aerospace Sciences Meeting*, Kissimmee, Florida, January 8-12, 2018.
5. Chaohua Guo, Jiaqi Wang, Baojun Bai, Xiaoming He, and Mingzhen Wei. Multi-stage fractured horizontal well numerical simulation and its application in tight shale reservoirs, SPE-176714, Society of Petroleum Engineers, *SPE Russian Petroleum Technology Conference*, Moscow, Russia, October 26-28, 2015.
6. Daniel Depew, Daoru Han, Joseph Wang, Xiaoming He, and Tao Lin. Immersed-Finite-Element Particle-In-Cell simulations of lunar surface charging, #199, 13th *Spacecraft Charging Technology Conference*, Pasadena, California, June 23-27, 2014.
7. Chaohua Guo, Mingzhen Wei, Haowei Chen, Xiaoming He, and Baojun Bai. Improved numerical simulation for shale gas reservoirs, OTC-24913, *Offshore Technology Conference Asia*, Kuala Lumpur, Malaysia, March 25-28, 2014.
8. Chaohua Guo, Baojun Bai, Mingzhen Wei, Xiaoming He, and Yushu Wu. Study on gas flow in nano pores of shale gas reservoirs, SPE-167179, Society of Petroleum Engineers, *SPE Unconventional Resources Conference-Canada*, Calgary, Canada, November 5-7, 2013.
9. John A. Burns, Xiaoming He, and Weiwei Hu. Control of the Boussinesq equations with implications for sensor location in energy efficient building, *American Control Conference*, pp. 2232-2237, Montréal, Canada, June 27-29, 2012.
10. Huilei Han, Yaping Liu, Tao Lü, and Xiaoming He. New Algorithm for the system of nonlinear weakly singular Volterra integral equations of the second kind and integro-differential equations, *Seventh International Conference on Scientific Computing and Applications*, pp. 1229-1235, Dalian, China, June 13-16, 2010.

11. Joseph Wang, Xiaoming He, and Yong Cao. Modeling spacecraft charging and charged dust particle interactions on lunar surface, 10th *Spacecraft Charging Technology Conference*, Biarritz, France, June 18-21, 2007.

Synergistic Activities

- Committee member of SIAM Committee On Programs and Conferences, January 2021 - current.
- Steering Committee Member of Midwest Numerical Analysis Day, May 2019 - current.
- Founding President of SIAM Central States Section, August 2014 - December 2016.
- Main contact for the petition to create the SIAM Central States Section, May 2014.
- Main organizer of Midwest Numerical Analysis Day 2021, Rolla, MO, October 29-30, 2021.
- Advisory committee member of the Fourth Annual Meeting of SIAM Central States Section, Norman, OK, October 5 - 7, 2018.
- Organizing committee member of the Third Annual Meeting of SIAM Central States Section, Fort Collins, CO, September 29 - October 1, 2017.
- Organizing committee chair of the Second Annual Meeting of SIAM Central States Section, Little Rock, AR, September 30 - October 2, 2016.
- Organizing committee chair of the First Annual Meeting of SIAM Central States Section, Rolla, MO, April 11 - 12, 2015.
- Co-Organizer (with James Liu) of the mini-symposium on “Algorithms, Analysis, and Applications of Numerical PDEs”, The Joint Mathematics Meetings, Denver, January 15-18, 2020.
- Co-Organizer (with Nolisa Malluwawadu) of the mini-symposium on “Recent advances in finite element methods”, The 5th Annual Meeting of SIAM Central States Section, Ames, IA, October 19-20, 2019.
- Co-Organizer (with Craig Douglas and Joseph V. Keobbe) of the workshop on “Computational sciences”, The 1st Annual Meeting of SIAM Northern States Section, Laramie, WY, September 27 - 28, 2019.
- Co-Organizer (with Weiwei Hu and John Singler) of the mini-symposium on “Computational methods for PDE constrained optimization and control”, 2019 SIAM Conference on Control and Its Applications, Chengdu, China, June 19 - 21, 2019.
- Co-Organizer (with Daozhi Han) of the mini-symposium on “Recent Advances in Numerical Methods for Subsurface Flows”, 2018 SIAM Conference on Mathematical & Computational Issues in the Geosciences, Houston, TX, March 11 - 14, 2019.
- Co-Organizer (with Erik Van Vleck) of the mini-symposium on “Recent Advances in Numerical PDEs”, The 4th Annual Meeting of SIAM Central States Section, Norman, OK, October 5 - 7, 2018.
- Co-Organizer (with Craig Douglas) of the mini-symposium on “Numerical Methods for Multiphysics Problems”, The 3rd Annual Meeting of SIAM Central States Section, Fort Collins, CO, September 29 - October 1, 2017.

- Co-Organizer (with Timo Heister and Ari Stern) of the mini-symposium on “Recent Advances in Numerical PDEs”, The 3rd Annual Meeting of SIAM Central States Section, Fort Collins, CO, September 29 - October 1, 2017.
- Co-Organizer (with Yassine Boubendir) of the mini-symposium on “Recent Advances in Domain Decomposition Methods”, 2017 SIAM Conference on Computational Science and Engineering, Atlanta, GA, February 27 - March 3, 2017.
- Co-Organizer (with Yassine Boubendir and Ju Ming) of the mini-symposium on “Recent advances in numerical methods for multi-physics problems”, 20th IMACS World Congress, Xiamen, China, December 10 - 14, 2016.
- Co-Organizer (with Huanzhen Chen, Do Y. Kwak and Xu Zhang) of the mini-symposium on “Structured-mesh methods for interface problems”, 2015 International Congress on Industrial and Applied Mathematics, Beijing, China, August 10 - 14, 2015.
- Co-Organizer (with Xuejun Xu) of the mini-symposium on “Decoupling methods for multi-physics and multi-scale problems”, 2015 International Congress on Industrial and Applied Mathematics, Beijing, China, August 10 - 14, 2015.
- Co-Organizer (with Xiaolin Li) of the mini-symposium on “Recent advances in numerical methods for interface problems”, 2015 SIAM Conference on Computational Science and Engineering, Salt Lake City, UT, March 14 - 18, 2015.
- Co-Organizer (with Yanping Lin) of the stream on “Numerical ordinary and partial differential equations”, 2013 International Conference on Engineering and Computational Mathematics, Hong Kong, China, December 16-18, 2013.
- Co-Organizer (with Michael Neilan) of the mini-symposium on “Recent advances in numerical methods for nonlinear partial differential equations”, 2013 SIAM Conference on Computational Science and Engineering, Boston, MA, February 25 - March 1, 2013.
- Co-Organizer (with Tao Lin, Xingzhou Yang, and Shan Zhao) of the mini-symposium on “Numerical PDEs for interface problems with applications”, 2011 SIAM Conference on Computational Science and Engineering, Reno, NV, February 28 - March 4, 2011.

Selected Invited Talks and Visiting Activities

- Department of Mathematics, University of Florida, FL, March 2021 (online).
- Department of Mathematics, Purdue University, IN, October 2018.
- Department of Mathematics, University of Geneva, Geneva, Switzerland, May 2018.
- Informatik 10, System Simulation, Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany, March-August, 2018.
- Department of Applied Mathematics, Illinois Institute of Technology, October 2017.
- Department of Mathematical Sciences, New Jersey Institute of Technology, NJ, April 2017.
- Department of Mathematics, University of Wyoming, WY, October 2016/September 2017.
- Department of Mathematics, Macau University, Macau, China, July 2015/June 2017.
- Department of Mathematics, University of South Carolina, Columbia, SC, November 2014.

- Department of Mathematics, University of Kansas, Lawrence, KS, March 2014.
- Department of Mathematics and Statistics, University of Missouri - Kansas City, Kansas City, MO, February 2014.
- Department of Applied Mathematics, Hong Kong Polytechnic University, Hong Kong, China, January 2013/December 2013/July 2015/May-August 2017/July 2019/May 2020(online).
- Department of Mathematics, University of California, Irvine, CA, October 2012.
- Department of Mathematics, Statistics and Physics, Wichita State University, Wichita, KS, October 2011.
- Department of Mathematics and Statistics, University of Maryland, Baltimore County, MD, May 2011.
- Department of Mathematics, Iowa State University, IA, April 2011.
- Department of Mathematics and Statistics, University of Arkansas, Little Rock, AR, March 2011.
- Mathematics Department, University of Arkansas, Fort Smith, AR, March 2011.
- Department of Mathematics and Statistics, Mississippi State University, MS, August 2010.
- Department of Mathematical and Statistical Sciences, University of Alberta, AB, Canada, August 2008.

Conference Presentations

- SIAM Conference on Computational Science and Engineering (Virtual Conference), March 1-5, 2021.
- Finite Element Circus (Virtual Conference), November 6-7, 2020.
- AMS Eastern Sectional Meeting (Virtual Conference), October 3-4, 2020.
- The 5th Annual Meeting of SIAM Central States Section, Ames, IA, October 19-20, 2019.
- The 1st Annual Meeting of SIAM Northern States Section, Laramie, WY, September 27-29, 2019.
- The 9th International Congress on International and Applied Mathematics, Valencia, Spain, July 15 - 19, 2019.
- 2019 SIAM Conference on Control and Its Applications, Chengdu, China, June 19 - 21, 2019.
- 2019 Middle West Numerical Analysis Day, Chicago, IL, April 20, 2019.
- 20th International Conference on Fluid Flow Problems, Chicago, IL, March 31-April 3, 2019.
- Finite Element Circus, West Lafayette, IN, March 22-23, 2019.
- 2019 SIAM Conference on Mathematical & Computational Issues in the Geosciences, Houston, TX, March 11-14, 2019.
- Finite Element Circus, Newark, DE, November 9-10, 2018.

- AMS Southeastern Sectional Meeting, Fayetteville, AR, November 3-4, 2018.
- AMS Central Sectional Meeting, Ann Arbor, MI, October 20-21, 2018.
- The 4th Annual Meeting of SIAM Central States Section, Norman, OK, October 5-7, 2018.
- The 3rd Annual Meeting of SIAM Central States Section, Fort Collins, CO, September 29 - October 1, 2017.
- Midwest Numerical Analysis Day, Omaha, NE, April 22, 2017.
- AMS Southeastern Sectional Meeting, Charleston, SC, March 10-12, 2017.
- 2017 SIAM Conference on Computational Science and Engineering, Atlanta, GA, February 27 - March 3, 2017.
- 20th IMACS World Congress, Xiamen, China, December 10-14, 2016.
- The 2nd Annual Meeting of SIAM Central States Section, Little Rock, AR, September 30 - October 2, 2016.
- Workshop on Computational Mathematics & Scientific Computing to honor Max Gunzburger's 70th birthday, Jeju Island, South Korea, August 19-22, 2015.
- The 8th International Congress on International and Applied Mathematics, Beijing, China, August 10-14, 2015.
- 2015 Summer Workshop on Finite Element Methods, Beijing, China, August 8-9, 2015.
- Finite Element Circus, Fairfax, VA, March 27-28, 2015.
- 2015 SIAM Conference on Computational Science and Engineering, Salt Lake City, UT, March 14-18, 2015.
- AMS Southeastern Sectional Meeting, Greensboro, NC, November 8-9, 2014.
- International Workshop on Computational Mathematics: Advances in Computational PDEs, Seoul, South Korean, August 9-12, 2014.
- The 13th Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, April 6-11, 2014.
- The 2nd International Conference on Engineering and Computational Mathematics, Hong Kong, China, December 16-18, 2013.
- 2013 SIAM Conference on Computational Science and Engineering, Boston, MA, February 25 - March 1, 2013.
- The 8th International Conference on Computational Physics, Hong Kong, China, January 7-11, 2013.
- Ninth Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Mississippi State University, MS, October 4-6, 2012.
- SIAM Conference on Uncertainty Quantification, Raleigh, NC, April 2-5, 2012.
- The 7th International Congress on International and Applied Mathematics, Vancouver, BC, Canada, July 18-22, 2011.

- International Conference on Interdisciplinary Applied and Computational Mathematics, Hangzhou, China, June 17-21, 2011.
- International Conference on Applied Mathematics and Interdisciplinary Research, Tianjing, China, June 13-16, 2011.
- 2011 SIAM Conference on Computational Science and Engineering, Reno, NV, February 28 - March 4, 2011.
- 30th Southeastern-Atlantic Regional Conference on Differential Equations, Blacksburg, VA, October 1-2, 2010.
- 2010 SIAM Annual Meeting, Pittsburgh, PA, July 12-16, 2010.
- Eighth Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Mississippi State University, MS, May 7-9, 2009.
- SIAM Conference on Computational Science & Engineering, Miami, FL, March 2-6, 2009.
- Second International Conference on Finite Element Methods in Engineering and Science, Lake Tahoe, CA, January 5-9, 2009.
- 2009 Joint Mathematics Meetings, Washington, DC, January 5-8, 2009.
- 2008 SIAM Annual Meeting, San Diego, CA, July 7-11, 2008.
- Seventh Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Birmingham, AL, November 1-3, 2007.

Conference and Workshop Participation

- Joint Meetings in Mathematics 2020, Denver, CO, January 15-18, 2020.
- Annual Meeting of the Alexander von Humboldt Foundation, Berlin, Germany, June 27-29, 2018.
- Network Meeting of the Alexander von Humboldt Foundation, Regensburg, Germany, April 25-27, 2018.
- The 3rd International Conference on Engineering and Computational Mathematics, Hong Kong, China, May 31-June 2, 2017.
- Workshop on Numerical Analysis and Mathematical Modeling, Hong Kong, China, May 29-30, 2017.
- IMA Special Workshop: Finite Element Circus, Minneapolis, MN, October 24-25, 2014.
- IMA Special Workshop: Structure-Preserving Discretizations of Partial Differential Equations, Minneapolis, MN, October 22-24, 2014.
- IMA Thematic Year on Simulating Our Complex World: Modeling, Computation and Analysis, Minneapolis, MN:
 - Workshop: Computing with Uncertainty: Mathematical Modeling, Numerical Approximation and Large Scale Optimization of Complex Systems, October 18-22, 2010.

- Workshop: Numerical Solutions of Partial Differential Equations: Novel Discretization Techniques, November 1-5, 2010.
 - Special Event: Finite Element Circus Featuring a Scientific Celebration of Falk, Pasciak, and Wahlbin, November 5-6, 2010.
 - Workshop: Numerical Solutions of Partial Differential Equations: Fast Solution Techniques, November 19-December 3, 2010.
- 2010 Joint Mathematics Meetings, San Francisco, CA, January 13-16, 2010.
 - Opening Workshop of the SAMSI Program on Random Media, Research Triangle Park, NC, September 23-26, 2007.

Referee for Journals and Proceedings

- Abstract and Applied Analysis
- Advances in Applied Mathematics and Mechanics
- Advances in Computational Mathematics
- Advances in Difference Equations
- Applied Mathematical Modeling
- Applied Mathematics and Computation
- Applied Mathematics Letters
- Applied Numerical Mathematics
- Asia-Pacific Journal of Chemical Engineering
- Communication on Applied Mathematics and Computation
- Communications in Nonlinear Science and Numerical Simulation
- Computational and Applied Mathematics
- Computational Geophysics
- Computer Methods in Applied Mechanics and Engineering
- Computer Physics Communication
- Computers and Mathematics with Applications
- CSIAM Transactions on Applied Mathematics
- Discrete and Continuous Dynamical Systems - Series B
- Electronic Research Archive
- Engineering Analysis with Boundary Elements
- ESAIM: Mathematical Modelling and Numerical Analysis (M2AN)
- IEEE Access

- International Journal for Numerical Methods in Fluids
- International Journal of Computer Mathematics
- International Journal of Heat and Mass Transfer
- International Journal of Mathematics and Mathematical Sciences
- International Journal of Numerical Analysis and Modeling
- International Journal of Numerical Analysis and Modeling, Series B
- International Journal of Numerical Methods for Heat and Fluid Flow
- International Journal of Uncertainty Quantification
- Journal of Computational and Applied Mathematics
- Journal of Computational Mathematics
- Journal of Computational Physics
- Journal of Computational Science
- Journal of Scientific Computing
- Mathematical Methods in the Applied Sciences
- Mathematics and Computers in Simulation
- Modeling and Computation for Flow and Transport
- Numerical Algorithms
- Numerical Mathematics: Theory, Methods, and Applications
- Numerical Methods for Partial Differential Equations
- Proceeding of 2014 American Control Conference
- Proceeding of 2019 International Conference on Computational Science
- Results in Applied Mathematics
- SIAM Journal on Numerical Analysis
- SIAM Journal on Scientific Computing

Teaching

- Missouri University of Science and Technology
 - Spring 2021: Math 3304 - Elementary Differential Equations (online asynchronous)
 - Fall 2020: Math 5001 (Experimental Course) - Introduction to Numerical Analysis; Math 6602 - Mathematical Foundation of Finite Element Methods; Math 3304 - Elementary Differential Equations (online asynchronous)
 - Spring 2020: Math 6001 (Experimental Course) - Mathematical Foundation of Finite Element Methods II;

- Fall 2019: Math 5001 (Experimental Course) - Introduction to Numerical Analysis; Math 6602 - Mathematical Foundation of Finite Element Methods;
 - Spring 2019: Math 6601 - Numerical Analysis; Math 6001 (Experimental Course) - Mathematical Foundation of Finite Element Methods II;
 - Fall 2018: Math 6602 - Mathematical Foundation of Finite Element Methods; Math 3304 - Elementary Differential Equations
 - Fall 2017: Math 6601 - Numerical Analysis; Math 6001 (Experimental Course) - Topics in Partial Differential Equations
 - Spring 2017: Math 6602 - Mathematical Foundation of Finite Element Methods; Math 3304 - Elementary Differential Equations
 - Fall 2016: Math 6601 - Numerical Analysis; Math 3304 - Elementary Differential Equations
 - Spring 2016: Math 6602 - Mathematical Foundation of Finite Element Methods; Math 5325 - Partial Differential Equations;
 - Fall 2015: Math 6601 - Numerical Analysis; Math 3304 - Elementary Differential Equations
 - Spring 2015: Math 6602 - Mathematical Foundation of Finite Element Methods
 - Fall 2014: Math 5325 - Partial Differential Equations; Math 3304 - Elementary Differential Equations
 - Spring 2014: Math 401 (Experimental Course) - Mathematical Foundation of Finite Element Methods; Math 204 - Elementary Differential Equations
 - Fall 2013: Math 401 (Experimental Course) - Numerical Analysis; Math 204 - Elementary Differential Equations
 - Spring 2013: Math 401 (Experimental Course) - Mathematical Foundation of Finite Element Methods
 - Fall 2012: Math 401 (Experimental Course) - Numerical Analysis; Math 204 - Elementary Differential Equations
 - Spring 2012: Math 325 - Partial Differential Equations; Math 204 - Elementary Differential Equations
 - Fall 2011: Math 325 - Partial Differential Equations; Math 204 - Elementary Differential Equations
 - Spring 2011: Math 204 - Elementary Differential Equations
 - Fall 2010: Math 204 - Elementary Differential Equations
- Virginia Tech
 - Fall 2008: Math 1205 - Differential Calculus
 - Summer I 2008: Math 1016 - Elementary Calculus I
 - Fall 2007: Math 1205 - Differential Calculus
 - Summer I 2007: Math 1206 - Integral Calculus
 - Summer II 2006: Pre-calculus

Undergraduate and Graduate Honors

- Ling Scholarship, Virginia Tech, Blacksburg, VA, 2006.
- Graduate Student Scholarship, Sichuan University, Chengdu, China, 2004.
- Undergraduate Thesis Award, Sichuan University, Chengdu, China, 2002.
- Undergraduate Student Scholarship, Sichuan University, Chengdu, China, 2000-2001.