Chen-Song Zhang: Curriculum Vitae

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Short Bio

Chen-Song Zhang is currently a professor at the Academy of Mathematics and Systems Science, CAS. He obtained his PhD from the *Applied Mathematics & Scientific Computing* program at the *University of Maryland, College Park, US*. His research interests include numerical methods for PDEs, adaptive mesh refinement, petroleum reservoir simulation, and complex fluid/flow simulation.

Education

Ph.D. in Applied Mathematics and Scientific Computing, July 2007
University of Maryland, College Park, MD, USA ⋆ Advisor: **Ricardo H. Nochetto**
Thesis: *Adaptive Finite Element Method for Variational Inequalities of Parabolic Type*

M.S. in Applied and Computational Mathematics, June 2002
Nanjing University, Nanjing, JS, China ⋆ Advisor: **Bing-Sheng He**
Thesis: *A modified augmented Lagrangian method for a class of monotone variational inequalities*

B.S. in Computational Mathematics, June 1999
Nanjing University, Nanjing, JS, China ⋆ GPA: 3.6/4.0

Employment

March, 2023 — Present: *Professor*
LSEC, Academy of Mathematics and Systems Science, Beijing, China

Sep, 2023 — Present: *Adjunct Professor*
University of CAS, Beijing, China

Sep, 2023 — Sep, 2025: *Adjunct Professor*
Shenzhen Research Institute of Bid Data, Shenzhen, China

March, 2014 — March, 2023: *Associate Professor*
LSEC, Academy of Mathematics and Systems Science, Beijing, China

Aug, 2011 — March, 2014: *Assistant Professor*
LSEC, Academy of Mathematics and Systems Science, Beijing, China

Postdoctoral Positions

July, 2010 — July, 2011: *Postdoctoral Fellow*
Peking University, Beijing, China ⋆ Mentor: **Zhiping Li**

June, 2007 — Feb, 2011: *CCMA Postdoc & Visiting Assistant Professor*
Penn State University, USA ⋆ Mentors: **Jinchao Xu, Ludmil Zikatanov**

Visiting Positions

Aug, 2015 — Sep, 2015: *Visiting Professor*
Penn State University, University Park, PA, USA

May, 2014 — July, 2014: *Visiting Professor*
Penn State University, University Park, PA, USA

July, 2009 — Jan, 2010: *Visiting Professor*
Beijing International Center for Mathematical Research, Beijing, China

Honors and Awards

- 2021: *CSIAM Certificate for Practical Applications of Applied Mathematics*, China
- 2020: *Best Thematic Track Paper Award*, International Conference on Computational Science
- 2006: *Graduate School Dean Dissertation-Completion Fellowship*, University of Maryland
- 2006: Mathematics Department Dissertation Fellowship, University of Maryland
- 2006: Center for Nonlinear Analysis Summer School Travel Fund, Carnegie Mellon University
- 2006: Seymour Goldberg Award (Spotlight on *Graduate Research*), University of Maryland
- 2001: Nanri *Excellent Thesis Fellowship*, Nanjing University
- 2000: Huawei *Outstanding Students in Computational Science*, Nanjing University
- 1999: Outstanding Student of Nanjing University, Nanjing University
- 1995: *Three-Good Merit High-School Student* of Jiangsu Province, Department of Education

Professional Committees and Services

- PC Member: Chinese Society of Rheology, 2025–present
- Editorial Board: Journal on Numerical Methods and Computer Applications, 2021–present
- PC Member: Algorithm, Software, and Applications, ORSC, 2023–present
- PC Member: Mathematics & Industry, CSIAM, 2022–present
- PC Member: HPC & Math Software, CSIAM, 2021–2022
- Organizing Committee: SOLVER Conference & SOLVER Challenge, 2018–present
- PC Vice-Chair: Numerical Methods for Petroleum & Water Resources, CSIAM, 2016–present

Research Fundings

- Jun/2026–Dec/2027: Science Challenge Project, TZ2025007-HT-08, PI.
- Jan/2026–Dec/2029: National Science Foundation of China 12571445, PI.
- Dec/2025–Dec/2027: State Key Laboratory of Mathematical Sciences Funding, co-PI.
- Sep/2025–Dec/2025: HiSim Project, RIPED, PetroChina.
- Sep/2025–Dec/2030: National Key R&D Program of China 2025ZD1406105.

- July/2024–Dec/2027: Strategic Priority Research Program of the CAS.
- Jan/2024–Dec/2028: Strategic Priority Research Program of the CAS.
- Jan/2023–Dec/2023: Shale Gas Simulation, RIPED, PetroChina, PI.
- Aug/2022–Aug/2023: Huawei Research Project on Elasticity Solvers, PI.
- Jan/2021–Dec/2025: National Key R&D Program of China 2020YFA0711900.
- Jan/2020–Dec/2021: Collaborative Research Project of PetroBras.
- Jan/2020–Dec/2023: Key Science and Technology Project of PetroChina, UPC.
- Jan/2020–Dec/2023: National Science Foundation of China 11971472, PI.
- Jan/2020–Dec/2020: HiSim Project, RIPED, PetroChina, PI.
- Jan/2019–Dec/2020: Science Challenge Project, TZZT2019-B1.1, PI.
- Jan/2016–Dec/2020: Key Research Program of Frontier Sciences, CAS, QYZDB-SSW-SYS018, PI.
- Jan/2016–Dec/2020: Science Challenge Project, JCKY2016212A503-1-303.
- Jan/2016–Dec/2020: State Key Dev. Prog. for Basic Research, 2016YFB0201304.
- Jan/2016–Dec/2018: Major Research Plan of NSFC, 91530323.
- Jan/2015–Dec/2018: Major Research Plan of NSFC, 91430215.
- Jan/2015–Dec/2015: IAPCM Fundamental Research Fund, PI.
- Jan/2014–Dec/2015: Scientific Research Foundation for Returned Overseas Chinese Scholars, State Education Ministry of China, PI.
- Jan/2012–Dec/2015: National Key Technology Research and Development Program (863) of the Ministry of Science and Technology of China, 2012AA01A3091.
- Jan/2012–Dec/2014: Major Research Plan of NSFC 91130011.
- Oct/2011–Oct/2014: Dean Startup Fund, Academy of Mathematics and System Sciences, PI.
- Jan/2011–Dec/2014: International Collaborative Project of PetroChina, 12HT105000002654.
- Dec/2010–Dec/2012: China Postdoc Science Foundation 45210148–0072, PI.
- Sep/2010: American Mathematical Society Travel Grant, PI.
- Sep/2009–March/2011: National Science and Technology Major Project of the Ministry of Science and Technology of China, CNOOCRC-2010-ZHKY-ZX-008.
- Sep/2009–Aug/2012: US National Science Foundation DMS–0915153, co-PI.

Selected Publications

[1] *Physics-informed neural networks for solving two-phase flow problems with moving interfaces*, Q. Zhai, P. Sun, X. Xie, X. Zhu, C.-S. Zhang, Computers and Mathematics with Applications, 223, 74–98 (09/2026). IF2025:2.71.

[2] *A discontinuous Galerkin method with Lagrange multiplier for fluid flow in fractured poroelastic media*, B. Zhou, R. Li, X. Zhang, C.-S. Zhang, Communications in Nonlinear Science and Numerical Simulation, 163, 110460 (06/2026). IF2025:4.12.

[3] *An adaptive subdomain coupling approach in domain decomposition for multiphase porous media flow*, S. Li, L. Zhao, C.-S. Zhang, Journal of Computational and Applied Mathematics, 487, 117644 (04/2026). IF2025:2.81.

[4] *R-PINN: Recovery-type a-posteriori estimator enhanced adaptive PINN*, R. Lu, J. Jia, Y.-J. Lee, Z. Lu, C.-S. Zhang, Journal of Computational Physics, 551, 114684 (04/2026). IF2025:4.43.

[5] *Combined discontinuous and continuous Galerkin methods for fractured poroelastic media flow on polytopic grids*, B. Zhou, R. Li, C.-S. Zhang, Z. Chen, Journal of Computational and Applied Mathematics, 474, 116986 (01/2026). IF2025:2.81.

[6] *A block algebraic multigrid method and its parallel optimization for fully implicit reservoir simulation*, L. Zhao, Y. Li, B. Wang, C.-S. Zhang. Journal on Numerical Methods and Computer Applications, 46(4): 321–345 (12/2025). In Chinese.

[7] *A next-generation algebraic multigrid library for semi-structured grids*, Z. Jia, Y. Zong, C.-S. Zhang Chensong et al. Journal on Numerical Methods and Computer Applications, 46(4): 283–295 (12/2025). In Chinese.

[8] *MGCFNN: A neural multigrid solver with novel Fourier neural network for high wave number Helmholtz equations*, Y. Xie, M. Lv, and C.-S. Zhang, The 13th International Conference on Learning Representations (ICLR 2025). CCF2025 Rank A.

[9] *A MgNO method for multiphase flow in porous media*, X. Liu, X. Yang, C.-S. Zhang, L. Zhang, and L. Zhao, In: Yao, J. et al. (eds) Progress and Challenge of Porous Media: Proceedings of the 16th Annual Meeting Conference on Porous Media. InterPore 2024, 953–969 (04/2025). Springer, Singapore.

[10] *A super-localized finite element method for inhomogeneous fourth-order singular perturbation problem*, B. Dai and C.-S. Zhang, Applied Mathematics Letters, 166, 109534 (03/2025). IF2024:2.9.

[11] *Semi-StructMG: A fast and scalable semi-structured algebraic multigrid*, Y. Zong, C.-S. Zhang, L. Mu et al. The 30th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming (PPoPP'25), 496–511 (02/2025). CCF2025 Rank A.

[12] *A Stokes-dual-porosity-poroelasticity model and discontinuous Galerkin method for the coupled free flow and dual porosity poroelastic medium problem*, R. Li, C.-S. Zhang, Z. Chen, Journal of Scientific Computing, 102:41 (01/2025). IF2024:3.3.

[13] *Lowest-degree robust finite element schemes for inhomogeneous bi-Laplace problems*, B. Dai, H. Zeng, C.-S. Zhang, and S. Zhang, Applied Numerical Mathematics, 203, 235–254 (09/2024). IF2022:2.994.

[14] *AutoAMG(θ): An auto-tuned AMG method based on deep learning for strong threshold*, H. Zou, X. Xu, C.-S. Zhang, and Z. Mo, Communications in Computational Physics, 36, 200–220 (07/2024). IF2022:3.791.

[15] *StructMG: A fast and scalable structured multigrid*, Y. Zong, X. Wang, H. Huang, C.-S. Zhang et al. The 29th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming (PPoPP'24), 478–480 (08/2024). CCF2022 Rank A.

[16] *Application-oriented preconditioning of seepage mechanics*, C. Feng, S. Li, S. Liu, C.-S. Zhang, L. Zhao, Chinese Journal of Computational Physics, 41, 98–109 (01/2024). In Chinese.

[17] *A Stokes–Darcy–Darcy model and its discontinuous Galerkin method on polytopic grids*, R. Li, Y. Gao, C.-S. Zhang, Z. Chen, Journal of Computational Physics, 510, 112780 (01/2024). IF2022:4.645.

[18] *On the existence of locally-defined projective interpolations*, H. Zeng, C.-S. Zhang, and S. Zhang, Applied Mathematics Letters, 146, 108789 (12/2023). IF2023:3.7.

[19] *An improved multistage preconditioner on GPUs for compositional reservoir simulation*, L. Zhao, S. Li, C.-S. Zhang et al., CCF Transactions on High Performance Computing, 5, 144–159 (02/2023). IF2023:1.3.

[20] *Parallel multi-stage preconditioners with adaptive setup for the black oil model*, L. Zhao, C. Feng, C.-S. Zhang, and S. Shu, Computers & Geosciences, 168, 105230 (10/2022). IF2022:5.168.

[21] *A low-degree strictly conservative finite element method for incompressible flows*, H. Zeng, C.-S. Zhang, and S. Zhang, SMAI Journal of Computational Mathematics, 8, 225–248 (09/2022).

[22] *A new analytical framework for the convergence of inexact two-grid methods*, X. Xu and C.-S. Zhang, SIAM Journal on Matrix Analysis and Applications, 43, 512–533 (03/2022). IF2020:1.944.

[23] *Linear solvers for petroleum reservoir simulation*, C.-S. Zhang, Journal on Numerical Methods and Computer Applications, 43, 1–26 (03/2022). In Chinese.

[24] *Convergence analysis of inexact two-grid methods: A theoretical framework*, X. Xu and C.-S. Zhang, SIAM Journal on Numerical Analysis, 60, 133–156 (01/2022). IF2020:3.212.

[25] *Optimal quadratic element on rectangular grids for H^1-problems*, H. Zeng, C.-S. Zhang, and S. Zhang, BIT Numerical Mathematics, 61, 665–689 (06/2021). IF2020:1.663.

[26] *An advanced ALE-mixed finite element method for a cardiovascular fluid–structure interaction problem with multiple moving interfaces*, P. Sun, C.-S. Zhang, R. Lan, L. Li, Journal of Computational Science, 50, 101300 (01/2021). IF2020:3.976.

[27] *Monolithic arbitrary Lagrangian–Eulerian finite element method for a multi-domain blood flow – aortic wall interaction problem*, P. Sun, C.-S. Zhang, R. Lan, and L. Li, In: Krzhizhanovskaya V. et al. (eds), Proceeding of International Conference on Computational Science 2020. CORE2020 Rank A. Lecture Notes in Computer Science, vol 12143, 60–74 (06/2020). Springer, Cham. **Best Thematic Track Paper of ICCS 2020**.

[28] *A numerical simulator for modeling the coupling processes of subsurface fluid flow and reactive transport processes in fractured carbonate rocks*, T. Yuan, C. Wei, C.-S. Zhang, and G. Qin, Water, 11, 1957, 1–18 (10/2019). IF2020:3.103.

[29] *Distributed Lagrange multiplier/fictitious domain finite element method for a transient Stokes interface problem with jump coefficients*, A. Lundberg, P. Sun, C. Wang, and C.-S. Zhang, Computer Modeling in Engineering and Sciences, 119, 35–62 (04/2019). IF2020:1.593.

[30] *Multiscale hybrid-mixed finite element method for flow simulation in fractured porous media*, P. Devloo, W. Teng, and C.-S. Zhang, Computer Modeling in Engineering and Sciences, 119, 145–163 (04/2019). IF2020:1.593.

[31] *A new estimate for a quantity involving the Chebyshev polynomials of the first kind*, X. Xu and C.-S. Zhang, Journal of Mathematical Analysis and Applications, 476, 302–308 (03/2019). IF2020:1.583.

[32] *Numerical simulation of an immersed rotating structure in fluid for hemodynamic applications*, W. Leng, C.-S. Zhang, P. Sun, et al., Journal of Computational Science, 30, 79–89 (01/2019). IF2020:3.976.

[33] *On the ideal interpolation operator in algebraic multigrid methods*, X. Xu and C.-S. Zhang, SIAM Journal on Numerical Analysis, 56, 1693–1710 (06/2018). IF2018:2.322.

[34] *ALE method for a rotating structure immersed in fluid and its application to artificial heart pump in hemodynamics*, P. Sun, W. Leng, C.-S. Zhang, et al., In Y. Shi, et al. (eds), Proceeding of International Conference on Computational Science 2018. CORE2018 Rank A. Lecture Notes in Computer Science, 10862, 9–23 (06/2018), Springer.

[35] *A new linear solver for fine-scale reservoir simulation*, Z. Li, S. Wu, Q. Li, C.-S. Zhang, et al., Journal of Numerical Methods and Computer Applications, 39, 1–9 (03/2018). In Chinese.

[36] *New perturbation bounds for the spectrum of a normal matrix*, X. Xu and C.-S. Zhang, Journal of Mathematical Analysis and Applications, 455, 1937–1955 (11/2017). IF2018:1.188.

[37] *Analytical decoupling techniques for fully implicit reservoir simulation*, C. Qiao, S. Wu, J. Xu, and C.-S. Zhang, Journal of Computational Physics, 336, 664–681 (05/2017). IF2018:2.845.

[38] *An error-resilient redundant subspace correction method*, T. Cui, J. Xu, and C.-S. Zhang, Journal of Computing and Visualization in Science, 18, 65–77 (01/2017).

[39] *Numerical studies of a class of linear solvers for fine-scale petroleum reservoir simulation*, Z. Li, S. Wu, C.-S. Zhang, and J. Xu, Journal of Computing and Visualization in Science, 18, 93–102 (01/2017).

[40] *An efficient SpMV for petroleum reservoir simulation on GPUs*, Z. Li, C. Feng, S. Shu, and C.-S. Zhang, Journal of Numerical Methods and Computer Applications, 37, 315–324 (12/2016). In Chinese.

[41] *Toward cost-effective reservoir simulation solvers on GPUs*, Z. Li, S. Wu, J. Xu, and C.-S. Zhang, Advances in Applied Mathematics and Mechanics, 8, 971–991 (12/2016). IF2018:0.844.

[42] *Accelerating reservoir simulation on multi-core and many-core architectures with graph coloring ILU(k)*, Z. Li, C. Feng, S. Shu, and C.-S. Zhang, Information Technology and Intelligent Transportation Systems, Springer, Switzerland, 454, 221–233 (11/2016).

[43] *Cost-effective parallel reservoir simulation on shared memory*, S. Wu, B. Wang, Q. Li, J. Xu, C.-S. Zhang, and C. Feng, SPE Asia Pacific Oil & Gas Conference and Exhibition, Perth, Australia (10/2016).

[44] *A stable and scalable hybrid solver for rate-type non-Newtonian fluid models*, Y.-J. Lee, W. Leng, and C.-S. Zhang, Journal of Computational and Applied Mathematics, 300, 103–118 (07/2016). IF2018:1.883.

[45] *An adaptive hybrid stress transition quadrilateral finite element method for linear elasticity*, F.-T. Huang, X.-P. Xie, and C.-S. Zhang, Journal of Computational Mathematics, 34, 339–364 (07/2016). IF2018:1.238.

[46] *On Robust and Efficient Parallel Reservoir Simulation on Tianhe-2*, W. Guan, C. Qiao, H. Zhang, C.-S. Zhang, et al., SPE Reservoir Characterization and Simulation Conference and Exhibition, SPE-175602 (08/2015).

[47] *A multilevel preconditioner and its shared memory implementation for a new generation reservoir simulator*, S. Wu, J. Xu, C. Feng, C.-S. Zhang, et al., Petroleum Science, 11, 540–549 (10/2014). IF2018:1.846.

[48] *A multi-stage preconditioner for the black oil model and its OpenMP implementation*, C. Feng, S. Shu, J. Xu, and C.-S. Zhang, Domain Decomposition Methods in Science and Engineering XXI, LNCSE Series, Springer-Verlag Berlin Heidelberg, 129–140 (05/2014).

[49] *On adaptive Eulerian–Lagrangian method for linear convection-diffusion problems*, X. Hu, Y.-J. Lee, J. Xu, and C.-S. Zhang, Journal of Scientific Computing, 58, 90–114 (01/2014). IF2018:2.370.

[50] *Numerical study of geometric multigrid on CPU–GPU heterogenous computers*, C. Feng, S. Shu, J. Xu, and C.-S. Zhang, Advances in Applied Mathematics and Mechanics, 6, 1–23 (01/2014). IF2018:0.844.

[51] *Application of auxiliary space preconditioning in field-scale reservoir simulations*, X. Hu, J. Xu, and C.-S. Zhang, Science China Mathematics, 56, 2737–2751 (12/2013). IF2018:1.031.

[52] *Multilevel preconditioners for a new generation reservoir simulator*, S. Wu, J. Xu, C.-S. Zhang, et al., SPE Reservoir Characterization and Simulation Conference and Exhibition, SPE-166011 (10/2013).

[53] *Combined preconditioning with applications in reservoir simulation*, X. Hu, S. Wu, X.-H. Wu, J. Xu, C.-S. Zhang, S. Zhang, and L. Zikatanov, Multiscale Modeling and Simulation, 11, 507–521 (08/2013). IF2017:2.277.

[54] *Application of an energy-minimizing algebraic multigrid method for subsurface water simulation*, R. Cheng, X. Huang, S. Shu, J. Xu, C.-S. Zhang, S. Zhang, and Z. Zhou, International Journal of Numerical Analysis and Modeling, 10, 374–388 (02/2013). IF2016:0.850.

[55] *Development of a fast auxiliary space preconditioner for numerical reservoir simulations*, X. Hu, W. Liu, G. Qin, J. Xu, and C.-S. Zhang, SPE Reservoir Characterization and Simulation Conference and Exhibition, SPE-148388, (09/2011).

[56] *Global existence and uniqueness of solutions to discretized viscoelastic flow models*, Y.-J. Lee, J. Xu, and C.-S. Zhang, Mathematical Models and Methods in Applied Sciences, 21, 1713–1732 (08/2011). IF2015:3.084.

[57] *Effects of integrations and adaptivity for the Eulerian–Lagrangian method*, J. Jia, X. Hu, J. Xu, and C.-S. Zhang, Journal of Computational Mathematics, 29, 367–395 (06/2011). IF2015:0.731.

[58] *Stable finite element discretizations for viscoelastic flow models*, Y.-J. Lee, J. Xu, and C.-S. Zhang, Handbook of Numerical Analysis (HNA) Vol. 16, Numerical Methods for Non-Newtonian Fluids, 371–432 (02/2011).

[59] *Multigrid methods for elliptic obstacle problems on 2D bisection grids*, L. Chen, R. H. Nochetto, and C.-S. Zhang, Domain Decomposition Methods in Science and Engineering XIX, LNCSE Series, Springer-Verlag Berlin Heidelberg, 229–236 (01/2011). ISBN 978-3-642-11303-1.

[60] *A posteriori error analysis for a class of integral equations and variational inequalities*, R. H. Nochetto, T. von Petersdorff, and C.-S. Zhang, Numerische Mathematik, 116, 519–552 (10/2010). IF2015:1.813.

[61] *A coarsening algorithm on adaptive grids by newest vertex bisection and its applications*, L. Chen and C.-S. Zhang, Journal of Computational Mathematics, 28, 767–789 (08/2010). IF2015:0.731.

[62] *Adaptive methods for variational inequalities: theory and applications in option pricing*, C.-S. Zhang, Lambert Academic Publishing, ISBN 978-3-8383-8457-3 (07/2010).

[63] *Adaptive finite element method for variational inequalities: theory and applications in finance*, C.-S. Zhang, Ph.D. Thesis, University of Maryland, College Park, ISBN 978-0549-32727-1 (07/2007).

[64] *A posteriori error analysis for parabolic variational inequalities*, K.-S. Moon, R. H. Nochetto, T. von Petersdorff, and C.-S. Zhang, ESAIM: Mathematical Modelling and Numerical Analysis, 41, 485–511 (05/2007). IF2009:1.483.

[65] *AFEM@matlab: A MATLAB package of adaptive finite element methods*, L. Chen and C.-S. Zhang, Tech Report, University of Maryland at College Park (03/2007).

[66] *A modified augmented Lagrangian method for a class of monotone variational inequalities*, B.-S. He, H. Yang, and C.-S. Zhang, European Journal of Operations Research 159, 35–51 (11/2004). IF2009:2.158.

Invited Conference Talks

[1] 2026: Short Course on PDEs and Frontiers of Earth Science, Xi'an, China

[2] 2026: Advanced Numerical Schemes for Multiphysics Problems, Sanya, China

[3] 2026: The 10th International Congress of Chinese Mathematicians, Shanghai, China

[4] 2025: Workshop on Approximate Computing in Numerical Linear Algebra, Beijing, China

[5] 2024: Forum on Biomechanics, Beijing, China

[6] 2024: Algorithm Software and Applications, Operations Research Society of China, Xinxiang, China

[7] 2024: Summer School on Scientific Computing and Machine Learning, Shenzhen, China

[8] 2023: HPCMid Workshop, Qingdao, China.

[9] 2022: **Plenary Speaker**, International Multigrid Conference, Lugano, Switzerland

[10] 2021: Summer School for Excellent Math Students, Nanjing University, China

[11] 2019: International Workshop on Multiphysics Problems, China

[12] 2019: Modeling & Simulation in Science, Saudi Arabia

[13] 2018: Lenovo HPC Summit, China

[14] 2016: International Conference on HPC Middleware, China

[15] 2015: 4th Brazil–China Conference on Scientific Computing, China

[16] 2015: 3rd International Conference on HPC and Applications, China

[17] 2013: **Plenary Speaker**, 16th National Symposium on Numerical Methods in Fluids, China

[18] 2013: **Plenary Speaker**, 4th Elsevier National Library Connect, China

[19] 2012: **Plenary Speaker**, 21st Intl. Conference on Domain Decomposition Methods, France

[20] 2011: **Plenary Speaker**, Symposium on Computational Science, Engineering and Finance, China

Other Invited Talks

[1] *Robustness and adaptivity of iterative solvers*, Xiangtan University, Aug 21, 2022.

[2] *Development of open-source software for multicomponent porous media flow*, Huawei, Shenzhen, July 7, 2022.

[3] *Numerical methods for problems with moving interface*, ICIAM, Spain, July 17, 2019.

[4] *Simulation of fluid flow in carbonate reservoirs*, Modeling & Simulation in Science, KAUST, Saudi Arabia, Feb 25, 2019.

[5] *Simulation of fluid flow in carbonate reservoirs*, TU Delft, Netherlands, Nov 15, 2018.

[6] *Numerical simulation of an immersed rotating structure in fluid*, CSIAM, Chengdu, Sep 15, 2018.

[7] *Multiphysics simulation and HPC*, Lenovo HPC Summit, Beijing, Aug 31, 2018.

[8] *Numerical simulation of discrete fracture networks*, CAM Colloquium, Penn State University, University Park, USA, Apr 30, 2018.

[9] *Field-scale petroleum reservoir simulation*, Short Course at China University of Petroleum, Qingdao, June 28–30, 2017.

[10] *Challenges in field-scale petroleum reservoir simulation*, International Workshop on Computational Mathematics for Young Scholars, Shanghai, June 04, 2017.

[11] *Parallel multilevel iterative methods for coupled PDEs*, International Workshop on Fluid-Structure Interaction Problems, Singapore, June 02, 2016.

[12] *Parallel petroleum reservoir simulation: numerical methods and their implementation*, Workshop on Large Scale Scientific Computing and Its Applications, Beijing, China, Dec 18, 2015.

[13] *Multilevel Iterative Methods for Coupled PDEs and Their Parallelization*, 4th China-Brazil Conference on Scientific Computing, Xi'an, China, Sep 24, 2015.

[14] *High-performance computing and its applications*, CCMA Luncheon Seminar, Penn State Univ, University Park, PA, USA, Aug 31, 2015.

[15] *Parallel solvers and multilevel methods for coupled PDEs*, 3rd International Conference on HPC and Applications, Shanghai, China, July 26, 2015.

[16] *FASP solver project*, NX Nastran, SIEMENS Co. Ltd., Shanghai, China, March 24, 2015.

[17] *Co-Design: From an algebraic solver perspective*, International Workshop on Co-Design, HPC China, Guangzhou, China, Nov 07, 2014.

[18] *Multilevel preconditioners for multiphase multicomponent flows in porous media*, 1st International Conference of Mathematics, Information and Computational Sciences, Beijing, China, Oct 20, 2014.

[19] *Multilevel iterative methods for fluid simulations*, 16th National Symposium on Numerical Methods in Fluids, Fenghuang, China, Aug 23, 2013.

[20] *How to organize 2500 papers: 15 years ago and now*, Elsevier National Library Connect, Nanchang, China, June 18, 2013.

[21] *Multilevel iterative methods for multiphase multicomponent flows in porous media*, Tsinghua University, Beijing, China, April 26, 2013.

[22] *Adaptive Eulerian–Lagrangian method for advection–diffusion equations*, Numerical Approximation of Partial Differential Equations, Gargnano, Italy, March 22, 2013.

[23] *FASP solvers and their applications in petroleum reservoir simulation*, Seminar, China University of Petroleum, Qingdao, China, Oct 07, 2012.

[24] *Numerical simulation of multiphase multicomponent flows in porous media*, Seminar, Institute of Mechanics, CAS, Beijing, China, Sep 17, 2012.

[25] *Fast auxiliary space preconditioning: implementation and applications in complex flows*, 21st International Conference on Domain Decomposition Methods, Rennes, France, June 28, 2012.

[26] *A parallel GAMG solver for the Stokes problem*, 8th International Conference on Scientific Computing and Applications, Las Vegas, US, April 03, 2012.

[27] *Effective solvers for enhanced oil recovery*, International Symposium on Computational Science, Engineering and Finance, Kunming, China, July 29, 2011.

[28] *Toward field-scale petroleum reservoir simulation*, PKU–PSU Smart Energy and Environment Workshop, Beijing, China, May 18, 2011.

[29] *Numerical simulation of enhanced oil recovery with polymer flooding*, Institute of Computational Mathematics and Scientific/Engineering Computing, CAS, Beijing, China, Dec 21, 2010.

[30] *Software design for petroleum reservoir simulations*, Applied Mathematics Seminar, Xiangtan University, Hunan, China, Nov 06, 2010.

[31] *Adaptive and multilevel algorithms for parabolic variational inequalities and their applications in finance*, Seminar on Mathematical Finance, Rutgers University, NJ, Oct 08. 2010.

[32] *Eulerian–Lagrangian methods for complex fluids simulation*, Numerical Analysis Seminar, University of Maryland, College Park, MD, Feb 24, 2010.

[33] *Multilevel algorithms for complex fluids*, Department of Mathematical Sciences Colloquium, University of Nevada, Las Vegas, NV, Jan 28. 2010.

[34] *A new coarsening algorithm and its applications in multilevel preconditioning and adaptivity*, Applied Mathematics Seminar, Nanjing University, Nanjing, China, Oct 19, 2009.

[35] *Multilevel algorithms for complex fluids simulation*, The 19th International Conference on Domain Decomposition Methods, Zhangjiajie, Hunan, China, Aug 17, 2009.

[36] *Multilevel algorithms for complex fluids simulation*, Numerical Analysis Seminar, University of California, Irvine, CA, May 11, 2009.

[37] *Adaptive methods for parabolic variational inequalities and their applications in finance*, Computational and Applied Mathematics Colloquium, Penn State University, State College, PA, Jan 25, 2007.

Conference & Workshop (as organizer)

- Nov 20–23, 2026: Solver2026, Shenzhen
- Aug 16–19, 2026: RHEO2026, Chinese Society of Rheology, Wuhan
- June 24–27, 2026: Long Feng Science Forum Workshop Series: Scientific Computing and Fast Solvers, Shenzhen
- June 13–14, 2026: Recent Advances in Numerical Analysis and Scientific Computing, Beijing
- Nov 16–18, 2025: Workshop on AI-Enabled Rheology Modeling and HPC Algorithms, Beijing
- Aug 2–5, 2025: Solver2025, Qingdao
- July 22–25, 2024: Solver2024, Chengdu
- July 08–19, 2024: CUHK and CUHK–Shenzhen joint summer school on scientific computing and machine learning, Shenzhen, China
- May 18–20, 2024: Numerical algorithms for microfluidic chip simulation, Shenzhen,
- May 13–16, 2024: Machine learning and big data in porous media, Interpore24, Qingdao
- Dec 8–10, 2023: Algorithm, software and applications, Operations Research Society of China
- Aug 7–11, 2023: Solver2023, Xining
- July 20–24, 2022: Solver2022, Chongqing
- Nov 12–14, 2021: Solver2021, Beijing
- June 22–25, 2021: Workshop on scientific computing with applications (dedicated to J. Xu)
- Aug 6–8, 2020: Solver2020, Suzhou
- Sep 6–7, 2019: 5th Workshop on Numerical Methods for PDEs, Beijing
- Aug 15–16, 2019: Solver2019, Kunming
- Aug 11–16, 2019: International Multigrid Conference 2019, Kunming
- Jan 14, 2019: Workshop on High-Performance Numerical Algorithms and Software for Large-Scale Scientific and Engineering Applications, HPC Asia 2019, Guangzhou
- June 22–25, 2018: Solver2018, Shaoshan
- June 1–8, 2018: 5th Workshop on Inter-Facial Dynamics and FSI Problems, Beijing & Sanya

- July 18–23, 2016: PKU Summer Program on Numerical Methods for PDEs, Beijing
- Dec 5–6, 2015: International Forum on Petroleum Reservoir Simulation, Guangzhou
- Aug 8–9, 2015: Workshop on finite element methods, Beijing
- Aug 5–7, 2015: Summer school on finite element methods, Beijing
- Aug 5–7, 2015: Short course on multigrid methods and applications, Beijing
- July 15–25, 2013: Workshop on Scientific Computing with Application, Kunming
- March 20–22, 2013: Numerical Approximation of PDEs (dedicated to R. Nochetto)
- Dec 6–7, 2012: International Forum on Petroleum Reservoir Simulation, Beijing
- Oct 28, 2011: Workshop on Mathematical Methods in Petroleum Reservoir Simulation, Beijing
- Aug 01–10, 2011: Workshop on Algebraic Multigrid Methods, Kunming

Teaching Experiences

Fall 2026 — University of CAS
Numerical Algebra

Fall 2024 — Academy of Mathematics and Systems Science
Introduction to Multilevel Iterative Methods

Spring 2023 — Academy of Mathematics and Systems Science
Introduction to Multilevel Iterative Methods

Summer 2022 — University of CAS, Online
Fast Solvers for Large Algebraic Systems

NJU Summer School 2021 — Nanjing University, Online
Algorithms and Applications for Supercomputing

Fall 2016/2018/2020 — Academy of Mathematics and Systems Science
Introduction to Multilevel Iterative Methods

PSU–PKU Joint Summer School 2009 — Peking University, Beijing
Numerical Methods for Partial Differential Equations

Fall 2008 — Penn State University, State College
Graduate Course: *Numerical Analysis I – Introduction to Algorithms*

Spring 2008 — Penn State University, State College
Graduate Course: *Advanced Numerical Optimization*

PSU–PKU Joint Summer School 2008 — Peking University, Beijing
Numerical Methods for Partial Differential Equations

Spring 2009 — Penn State University, State College
Calculus II

Spring 2008 — Penn State University, State College
Linear Algebra

Fall 2007 — Penn State University, State College
Advanced Calculus

Fall 2002, Spring/Fall 2003, Fall 2004 — University of Maryland, College Park
Calculus I/II

Graduate Students and Postdocs

(10) Yu Ou, master student, 2026–present
(9) Jiashuo Xia, master student, 2025–present
(8) Li Zhao, Postdoc, 2023–2025
(7) Yan Xie, PhD student, 2021–2026
(6) Bin Dai, PhD student, 2020–2025
(5) Shizhe Li, PhD student, 2019–2024
(4) Kailei Zhang, master student, 2018–2021
(3) Huilan Zeng, PhD student, 2016–2021
(2) Ronghong Fan, PhD student, 2015–2020
(1) Xuefeng Xu, PhD student, 2014–2019

Visiting Scholars and Students

(8) Boqian Shen, KAUST, Saudi Arabia, 03/2023–07/2023
(7) Linjie Zhang, Xiangtan University, China, 03/2023–06/2023
(6) Ting Lai, Xiangtan University, China, 07/2021–08/2021
(5) Huipeng Gu, Southern Univ of Science & Technology, China, 07/2021–08/2021
(4) Haoran Qi, Penn State University, USA, 09/2020–12/2020
(3) Wenchao Teng, Chinese Univ of Petroleum, Qingdao, 07/2017–12/2017
(2) Haifeng Zou, Beijing Univ of Technology, 09/2016–06/2018
(1) Zheng Li, Xiangtan University, 09/2014–12/2016

Software Projects

- `AFEM@matlab`: A Matlab package for adaptive finite element methods (now in `iFEM`)
- `FASP`: A software package for high-performance auxiliary space preconditioners
- `OpenCAEPoro`: An open-source package for multicomponent porous media flow
- `OpenCAXPlus`: An open-source project that combines CAD/CAE/CAM and AI

Skills

- Languages: Chinese (native), English (fluent)
- Computer Skills: C/C++, Fortran, MPI/OpenMP, Matlab
- Certificates: Senior Programmer Certificate (now as Software Designer Certificate)
- Others: Mendeley Advisor

References

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