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EDUCATION

Ph.D. Brown University, USA 2007
M.S. Peking University, China 2001
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EMPLOYMENT HISTORY

2021 - Professor, Mathematics/CCT, Louisiana State University
2015 - 21 Associate professor, Mathematics/CCT, Louisiana State University
2009 - 15 Assistant professor, Mathematics/CCT, Louisiana State University
Fall 2012 Member of the NSF Institute for Computational and Experimental
Research in Mathematics (ICERM), Providence RI
2008 - 09 Visiting assistant professor, Mathematics/CCT, Louisiana State University
2008 - 09 Postdoctoral research associate, PACM, Princeton University
2007 - 08 Joint postdoctoral research associate, Brown University and MIT

PUBLICATIONS

Book chapters

- X. Wan and G.E. Karniadakis, Adaptive numerical solutions of stochastic differential equations, *Computer Mathematics and its Applications: Advances and Developments (1994-2005)*. p561-573. Editor, E. A. Lipitakis, LEA.

Preprints

- X. Wan and K. Tang, Augmented KRnet for density estimation and approximation, (2021), arXiv:2105.12866v2.
- K. Tang, X. Wan and C. Yang, DAS-PINNs: A deep adaptive sampling method for solving high-dimensional partial differential equations, (2021), arXiv:2112.14038v2.

Journal publications

- J.-H. Liang, J. Yuan, X. Wan, J. Liu, B. Liu, H. Jang, and M. Tyagi, Exploring the use of machine learning to parameterize vertical mixing in the ocean surface boundary layer, *Ocean Modelling*, 176, (2022), 102059.

- K. Tang, X. Wan and Q. Liao, Adaptive deep density approximation for Fokker-Planck equations, *Journal of Computational Physics*, 457 (2022), 111080.
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- K. Tang, X. Wan and Q. Liao, Deep density estimation via invertible block-triangular mapping, *Theoretical & Applied Mechanics Letters*, 10 (2020), 000-5.
- X. Wan and S. Wei, Coupling the reduced-order model and the generative model for an importance sampling estimator, 408(2020), 109281.
- X. Yang, X. Wan, L. Lin and Huan Lei, A general framework of enhancing sparsity of generalized polynomial chaos expansion, *International Journal for Uncertainty Quantification*, 9(3) (2019), pp. 221-243.
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- X. Wan, B. Zheng and G. Lin, An hp adaptive minimum action method based on a posteriori error estimate, *Communications in Computational Physics*, 23(2) (2018), pp. 408-439.
- X. Wan and H. Yu, A dynamic-solver-consistent minimum action method: With an application to 2D Navier-Stokes equations, *Journal of Computational Physics*, 331 (2017), pp. 209-226.
- X. Wan, A minimum action method with optimal linear time scaling, *Communications in Computational Physics*, 18(5) (2015), pp. 1352-1379.
- X. Wan, H. Yu and W. E, Model the nonlinear instability of wall-bounded shear flows as a rare event: A study on two-dimensional Poiseuille flow, *Nonlinearity*, 28 (2015), pp. 1409-1440.
- M. Zheng, X. Wan and G. Karniadakis, Adaptive multi-element polynomial chaos with discrete measure: Algorithms and applications to SPDEs, *Applied Numerical Mathematics*, 90 (2015), pp. 91-110.
- L. Zhu, Q. Chen and X. Wan, Optimization of non-hydrostatic Euler model for water waves, *Coastal Engineering*, 91 (2014), pp. 191-199.

- G. Lin, M. Elizondo, S. Lu and X. Wan, Uncertainty quantification in dynamic simulations of large-scale power system models using the high-order probabilistic collocation method on sparse grids, *Journal of Uncertainty Quantification*, 4(3) 2014, pp. 185-204.
- H. Babaei, X. Wan and S. Acharya, Effect of uncertainty in blowing ratio on film cooling effectiveness, *ASME Journal of Heat Transfer*, 136(3), 2014, 031701.
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- X. Wan and G. Lin, Hybrid parallel computing of minimum action method, *Parallel Computing*, 39 (2013), pp. 638-651.
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- X. Wan, A high-order adaptive minimum action method, *Journal of Computational Physics*, 230 (2011), pp. 8669-8682.
- X. Wan, A note on stochastic elliptic models, *Computer Methods in Applied Mechanics and Engineering*, 199(45-48) (2010), pp. 2987-2995.
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- X. Wan, B. Rozovskii and G. E. Karniadakis, A stochastic modeling methodology based on weighted Wiener chaos and Malliavin calculus, *Proceedings of the National Academy of Sciences*, 106 (2009), pp. 14189-14194.
- X. Wan and G.E. Karniadakis, Solving elliptic problems with spatially-dependent non-Gaussian random inputs: algorithms, error analysis and applications, *Computer Methods in Applied Mechanics and Engineering*, 198/21-26 (2009), pp. 1985-1995.

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- X. Wan, Some improvements to the flux-type *a posteriori* error estimators, *Computer Methods in Applied Mechanics and Engineering*, 197/6-8 (2008), pp. 567-576.
- G. Lin, X. Wan, C.-H. Su and G.E. Karniadakis, Stochastic fluid mechanics, *IEEE Computing in Science and Engineering (CiSE)*, 9 (2007), pp. 21-29.
- X. Wan and G.E. Karniadakis, Stochastic heat transfer in a grooved channel, *Journal of Fluid Mechanics*, 565 (2006), pp. 255-278.
- X. Wan and G.E. Karniadakis, Long-term behaviors of polynomial chaos in stochastic flow simulations, *Computer Methods in Applied Mechanics and Engineering*, 195 (2006), pp. 5582-5596.
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- X. Wan, D. Xiu and G. E. Karniadakis, Stochastic solutions for the two-dimensional advection-diffusion equation, *SIAM Journal on Scientific Computing*, 26 (2004), pp. 578-590.

Conference proceedings

- H. Babaei, X. Wan and S. Acharya, Effect of uncertainty in blowing ratio on film cooling effectiveness, *Proceedings of ASME Heat Transfer 2013, Minneapolis*, July 14-19, 2013.
- H. Babaei, S. Acharya and X. Wan, Optimization of forcing parameters of film cooling effectiveness, *Proceedings of the ASME Turbo Expo 2013*, San Antonio, June 3-7, 2013.
- L. Zhu, Q. Chen and X. Wan, Numerical modeling of nonlinear water waves with Sigma coordinate and layer thickness optimization, *Proceedings of XIX International Conference on Water Resources (CMWR 2012)*, University of Illinois at Urbana-Champaign, June 17-22, 2012.

- X. Wan and G. E. Karniadakis, Recent advances in polynomial chaos methods, *Proceedings of the Applied Vehicle Technology Panel (AVT) Symposium: Computational Uncertainty in Military Vehicle Design (NATO/PfP Unclassified)*, 3-6 December 2007, Greece, Athens.
- X. Wan and G. E. Karniadakis, Spectral/ hp element method in random space, *Proceedings of the 5th GRACM International Congress on Computational Mechanics*, June 29 - July 1, 2005, Limassol, Cyprus.
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- X. Wan, D. Xiu and G. E. Karniadakis, Modeling uncertainty in three-dimensional heat transfer problems, *Proceedings of Advanced Computational Methods in Heat Transfer VIII*, March 24-26, 2004, Lisbon, Portugal.

RESEARCH SUPPORTED BY

- LSU - 2010 Council on Research Summer Stipend Program, 2010.
- DOE - Stochastic nonlinear data-reduction methods with detection & prediction of critical rare events, co-PI, 2009-2012.
- NSF - Wick-type stochastic modeling: algorithms and applications, single PI, 2011-2015.
- AFOSR - Effects of small noise on conservation laws: algorithms and applications, single PI, 2015-2018.
- NSF - Nonlinear instability of Navier-Stokes equations from a probabilistic point of view: numerics and simulations, single PI, 2016-2020.
- NSF - Efficient algorithms related to and beyond the large deviation technique, single PI, 2019-2023.