Curriculum Vitae

Xiaoliang Wan

Contact Information

Department of Mathematics and
Center for Computation and Technology (CCT)
Louisiana State University
Baton Rouge, LA 70803
http://www.math.lsu.edu/~xlwan/

Phone: 225-578-6367
Email: xlwan@math.lsu.edu

Education

Ph.D.	Brown University, USA	2007
M.S.	Peking University, China	2001
B.S.	Peking University, China	1998

Positions

2015 -	Associate professor, Mathematics/CCT, Louisiana State University
2009 - 15	Assistant professor, Mathematics/CCT, Louisiana State University
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

Research Interest

- Numerical methods of stochastic partial differential equations.
- Error control and adaptivity of deterministic/stochastic finite element methods.
- Large deviation theory and minimum action method.
- Parallel scientific computing.

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.*

Publications

- Journal Articles

- J. Liang, X. Wan, K. Rose, J. McWilliams and P. Sullivan, Horizontal dispersion of buoyant materials in the ocean surface boundary layer, submitted.
- X. Yang, X. Wan and L. Lin, A general framework of enhancing sparsity of generalized polynomial chaos expansion, submitted.
- X. Wan, H. Yu and J. Zhai, Convergence analysis of a finite element approximation of minimum action method, SIAM Journal on Numerical Analysis, accepted.

- X. Wan and X. Zhou, Asymptotically efficient simulation of elliptic problems with small random forcing, *SIAM Journal on Scientific Computing*, 40(1) (2018), pp. A548-A572.
- 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 ahd 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.
- H. Babaee, X. Wan and S. Acharya, Effect of uncertainty in blowing ratio on film cooling effectiveness, *ASME Journal of Heat Transfer*, 136(3) 2014, pp. 031701.
- L. Zhu, Q. Chen and X. Wan, Optimization of non-hydrostatic Euler model for water waves, *Coastal Engineering*, 91 (2014), pp. 191-199.
- H. Babaee, X. Wan and S. Acharya, Effect of uncertainty in blowing ratio on film cooling effectiveness, *ASME Journal of Heat Transfer*, 136(3) (2014), 031701.
- X. Wan and B. Rozovskii, The Wick-Malliavin approximation of elliptic problems with log-normal random coefficients, *SIAM Journal on Scientific Computing*, 35(5) (2013), pp. A2370-A2392.
- D. Venturi, X. Wan, R. Mikulevicius, B. Rozovskii and G. Karniadakis, Wick-Malliavin approximation to nonlinear stochastic PDEs: analysis and simulations, *Proceedings of the Royal Society A*, 469 (2013), 20130001.
- H. Babaee, S. Acharya and X. Wan, Optimization of forcing parameters of film cooling effectiveness, *ASME Journal of Turbomachinery*, *ASME Journal of Turbomachinery* 136 (2014), 021016.
- X. Wan, A minimum action method for small random perturbations of two-dimensional parallel shear flows, *Journal of Computational Physics*, 235 (2013), pp. 497-514.
- X. Wan and G. Lin, Hybrid parallel computing of minimum action method, *Parallel Computing*, 39 (2013), pp. 638-651.
- 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.
- X. Wan, A discussion on two stochastic modeling strategies for elliptic problems, *Communications in Computational Physics*, 11 (2012), pp. 775-796.

- 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.
- X. Wan, X. Zhou and W. E, Study of the noise-induced transition and the exploration of the phase space for the Kuramoto-Sivashinsky equation using the minimum action method, *Nonlinearity*, 23 (2010), pp. 475-493.
- S. V. Lototsky, B. L. Rozovskii and X. Wan, Elliptic equations of higher stochastic order, *ESAIM: Mathematical Modelling and Numerical Analysis*, 5/4 (2010), pp. 1135-1153.
- D. Venturi, X. Wan and G. E. Karniadakis, Stochastic bifurcation and stability of natural convective flows in bidimensional square enclosures, *Journal of Fluid Mechanics*, 650 (2010), pp. 391-413.
- 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.
- X. Wan and G.E. Karniadakis, Error control in multi-element generalized polynomial chaos method for elliptic equations with random coefficients, *Communications in Computational Physics*, 5/2-4 (2009), pp. 793-820.
- J. Foo, X. Wan and G.E. Karniadakis, The multi-element probabilistic collocation method: error analysis and simulation, *Journal of Computational Physics*, 227(2008), pp. 9572-9595.
- D. Venturi, X. Wan and G.E. Karniadakis, Stochastic low dimensional modeling of random laminar wake past a circular cylinder, *Journal of Fluid Mechanics*, 606 (2008), pp. 339-367.
- 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.
- X. Wan and G.E. Karniadakis, Multi-element generalized polynomial chaos for arbitrary probability measures, *SIAM Journal on Scientific Computing,* 28 (2006), pp. 901-928.
- X. Wan and G.E. Karniadakis, Beyond Wiener-Askey expansions: handling arbitrary PDFs, *Journal of Scientific Computing,* 27 (2006), pp. 455-464.

- X. Wan and G.E. Karniadakis, A sharp error estimate of the Fast Gauss Transform, *Journal of Computational Physics,* 219 (2006), pp. 7-12.
- X. Wan and G.E. Karniadakis, An adaptive multi-element generalized polynomial chaos method for stochastic differential equations, *Journal of Computational Physics,* 209 (2005), pp. 617-642.
- 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.

-Proceedings

- H. Babaee, X. Wan and S. Acharya, Effect of uncertainty in blowing ratio on film cooling effectiveness, ASME Heat Transfer 2013, Minneapolis, July 14-19, 2013.
- H. Babaee, S. Acharya and X. Wan, Optimization of forcing parameters of film cooling effectiveness, *Proceedings of the ASME Tubo 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.
- X. Wan and G. E. Karniadakis, Simulation of heat transfer with uncertainty, *Proceedings of the ASME 2005 Summer Heat Transfer Conference*, July 17-22, 2005, Westin St. Francis, San Francisco, CA.
- 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.