

Papers on Polynomial Chaos

1. G. Lin* and G.E. Karniadakis, "Sensitivity analysis and stochastic simulations of non-equilibrium plasma flow", *Int. J. Num. Meth. Eng.*, vol. 80, pp. 738-766, 2009.
2. X. Wan*, B. Rozovskii and G.E. Karniadakis, "A stochastic modeling methodology based on weighted Wiener chaos and Malliavin calculus", *PNAS*, vol. 106, no. 34, pp. 14189-14194, 2009.
3. J. Foo*, S. Sindi and G.E. Karniadakis, "Multi-element probabilistic collocation for sensitivity analysis in cellular signaling networks", *IET Systems Biology*, vol. 3 (4), pp. 239-254, 2009.
4. G. Lin*, C.-H. Su and G.E. Karniadakis, "Stochastic modeling of random roughness in shock scattering problems: Theory and simulations", *Computer Methods in Applied Mechanics and Engineering*, vol. 197, pp. 3420-3434, 2008.
5. X. Wan* and G.E. Karniadakis, "Error control in multi-element generalized polynomial chaos method for elliptic problems with random coefficients", *Communication in Computational Physics*, vol. 5, pp. 793-820, 2009.
6. X. Wan* and G.E. Karniadakis, "Solving elliptic problems with non-Gaussian spatially-dependent random coefficients: algorithms, error analysis and applications", *Comput. Methods Appl. Mech. Engr.*, invited, 2008.
7. J. Foo*, X. Wan* and G.E. Karniadakis, "The multi-element probabilistic collocation method: error analysis and simulation", *J. Comp. Phys.*, vol. 227, pp. 9572-9595, 2008.
8. D. Venturi, X. Wan and G.E. Karniadakis, "Stochastic low dimensional modeling of random laminar wake past a circular cylinder", *Journal of Fluid Mechanics*, vol. 606, pp. 339-367, 2008.
9. G. Lin, X. Wan, C.-H. Su and G.E. Karniadakis, "Stochastic fluid mechanics", *IEEE Computing in Science and Engineering (CiSE)*, vol. 9, pp. 21-29, 2007.
10. G. Lin*, C.-H. Su and G.E. Karniadakis, "Random roughness enhances lift in supersonic flow", *Phys. Rev. Lett.*, vol 99, (10), 104501, 2007.
11. J. Foo*, Z. Yosibash and G.E. Karniadakis, "Stochastic simulation of riser-sections with uncertain measured pressure loads and/or uncertain material properties", *Comput. Methods Appl. Mech. Engr.*, vol. 196, pp. 4250-4271, 2007.
12. X. Wan* and G.E. Karniadakis, "A sharp error estimate for the fast Gauss transform", *J. Comp. Phys.*, vol. 219, pp. 7-12, 2006.
13. G. Lin*, C.-H. Su and G.E. Karniadakis, "Predicting shock dynamics in the presence of uncertainties", *J. Comp. Phys.*, vol. 217, pp. 260-276, 2006.
14. X. Wan* and G.E. Karniadakis, "Stochastic heat transfer enhancement in a grooved channel", *J. Fluid Mech.*, vol. 565, pp. 255-278, 2006.
15. X. Wan* and G.E. Karniadakis, "Beyond Wiener-Askey expansions: Handling arbitrary PDFs", *Journal of Scientific Computing*, vol. 27, pp. 455-464, 2006.
16. X. Wan* and G.E. Karniadakis, "Multi-element generalized polynomial chaos for arbitrary probability measures", *SIAM Journal of Scientific Computing*, vol. 28(3), pp. 901-928, 2006.
17. X. Wan* and G.E. Karniadakis, "Long-term behavior of polynomial chaos in stochastic flow simulations", *Comput. Methods Appl. Mech. Engrg.*, vol. 195, pp. 5528-5596, 2006.
18. G. Lin*, L. Grinberg and G.E. Karniadakis, "Numerical studies of the stochastic Korteweg de Vries equation", *Journal of Computational Physics*, vol. 213(2), pp. 676-703, 2006.
19. X. Wan and G.E. Karniadakis, "Adaptive numerical solutions of stochastic differential equations", *Computer Mathematics & its Applications (1994-2005)*, pp. 561-573, 2006.
20. "Uncertainty Quantification in Simulation Science", special issue of *Journal of Computational Physics*, vol. 217, no. 1, 2006, guest editor (co-editor: James Glimm).

21. X. Wan* and G.E. Karniadakis, "An adaptive multi-element generalized polynomial chaos method for stochastic differential equations", *J. Comp. Phys.*, vol. 209(2), pp. 617-642, 2005.
22. X. Wan*, D. Xiu* and G.E. Karniadakis, "Stochastic solutions for the two-dimensional advection-diffusion equation", *SIAM J. Sci. Comput.*, vol. 26(2), pp. 578-590, 2004.
23. D. Lucor* and G.E. Karniadakis, "Adaptive generalized polynomial chaos for nonlinear random oscillators", *SIAM J. Sci. Comput.*, vol. 26(2), pp. 720-735, 2004.
24. D. Xiu* and G.E. Karniadakis, "Supersensitivity due to uncertain boundary conditions", *Int. J. Num. Meth. Eng.*, vol. 61, pp. 2114-2138, 2004.
25. G. Lin*, C.-H. Su and G.E. Karniadakis, "The stochastic piston problem", *Proc. National Academy of Sciences*, vol. 101, pp. 15840-15845, 2004.
26. D. Lucor* and G.E. Karniadakis, "Noisy inflows cause a shedding-mode switching in flow past an oscillating cylinder", *Phys. Rev. Lett.*, vol. 92(15), 154501, 2004. (featured on the cover).
27. D. Lucor*, C.-H. Su and G.E. Karniadakis, "Generalized polynomial chaos and random oscillators", *Int. J. Num. Meth. Eng.*, vol. 60(3), pp. 571-596, 2004.
28. D. Xiu* and G.E. Karniadakis, "Generalized polynomial chaos: Performance evaluation and applications", chapter in *Dynamic Data Driven Applications Simulations (DDDAS)*, editor F. Darema, Kluwer, 2004.
29. D. Lucor* and G.E. Karniadakis, "Predictability and uncertainty in flow-structure interactions", *European Journal of Mechanics B/Fluids*, vol. 23, pp. 41-49, 2004.
30. D. Lucor*, D. Xiu*, C.-H. Su and G.E. Karniadakis, "Predictability and uncertainty in CFD", *Int. J. Num. Meth. Fluids*, vol. 43(5), pp. 485-505, 2003.
31. D. Xiu* and G.E. Karniadakis, "Modeling uncertainty in flow simulations via Generalized Polynomial Chaos", *J. Comp. Phys.*, vol. 187, pp. 137-167, 2003.
32. D. Xiu* and G.E. Karniadakis, "Modeling uncertainty in flow simulations via generalized polynomial chaos", *J. Comp. Phys.*, vol. 187, pp. 137-167, 2003.
33. D. Xiu* and G.E. Karniadakis, "A new stochastic approach to transient heat conduction modeling with uncertainty", *Int. J. Heat & Mass Transfer*, vol. 46, pp. 4681-4693, 2003.
34. D. Xiu* and G.E. Karniadakis, "The Wiener-Askey Polynomial Chaos for stochastic differential equations", *SIAM Journal of Scientific Computing*, vol 24, no. 2, pp. 619-644, 2002.
35. D. Xiu*, D. Lucor*, C.-H. Su and G.E. Karniadakis, "Stochastic modeling of flow-structure interactions using Generalized Polynomial Chaos", *J. Fluids Engineering*, vol. 124, pp. 51-59, 2002.
36. M. Jardak*, C.-H. Su and G.E. Karniadakis, "Spectral Polynomial Chaos solutions of the stochastic advection equation", *J. Sci. Comp.*, vol. 17, pp. 319-338, 2002.
37. G.E. Karniadakis, "Quantifying Uncertainty in CFD", Managing Editor of special issue of *J. Fluids Engineering*, March 2002.
38. D. Xiu* and G.E. Karniadakis, "Modeling uncertainty in steady state diffusion problems via generalized polynomial chaos", *Comput. Methods Appl. Mech. Engrg.*, vol. 191, pp. 4927-4948, 2002.
39. G.E. Karniadakis, "Towards a numerical error bar in CFD," Editorial Article, *J. Fluids Engineering*, March 1995.