Curriculum Vitæ

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Anthony Nouy

Professor at Ecole Centrale de Nantes, France.
Department of Informatics and Mathematics, GeM UMR 6183.

Professional experience

Since 2010	:	Full Professor at Ecole Centrale Nantes, Department of Mathematics and Informatics, Research Institute in Civil Engineering and Mechanics.
2004-2009	:	Associate Professor at Université de Nantes.
2001-2004	:	Adjunct Lecturer at Ecole Normale Supérieure de Cachan and Université Paris 6.
2000-2002	:	Adjunct Lecturer at Ecole Centrale Paris.

Education and Degrees

2008	:	Habilitation à Diriger des Recherches, Université de Nantes.
2003	:	Ph.D. in Computational Mechanics, Ecole Normale Supérieure de Cachan.
2000	:	Master degree in Computational Mechanics at Université Paris 6, France.
2000	:	Advanced degree in mechanics (Agrégation).
1997-2001	:	Student-Teacher at Ecole Normale Supérieure de Cachan.

Research interests

- Numerical methods for Uncertainty Quantification
- Model reduction methods for PDEs
- Low-rank and sparse tensor methods for high dimensional problems
- Multiscale computational methods, Domain decomposition methods, Homogenization

Professional activities

Societal activities

- Member of the Bureau of the French Research Group Mascot-Num (dealing with stochastic methods for the analysis of numerical codes), since 2011.
- Member of the Bureau of the Group SMAI-SIGMA (Signal Image Geometry Modeling Approximation) since 2016.
- Participation to Research Groups : GDR MoMaS (2008-2011), GDR AMORE (since 2011), GDR MANU (since 2016).
- Editorial board of Mathematical Problems In Engineering (2011-2013).
- Guest Editor, special issue on "Recent advances in Proper Generalized Decompositions", Archives of Computational Methods in Engineering, 2010.
- Guest Editor of ESAIM:Proceedings, 2014.
- Reviewer for international journals: Foundations of Computational Mathematics, SIAM J. Scientific Computing, Computer Methods in Applied Mechanics and Engineering, SIAM Journal on Matrix Analysis and Applications, SIAM J. Uncertainty Quantification, International Journal for Numerical Methods in Engineering, ESAIM: Mathematical Modelling and Numerical Analysis, Journal of Computational Physics, SIAM Journal on Numerical Analysis, Applied Mathematics and Computation, International Journal for Multiscale Computational Engineering, Physica D : Nonlinear Phenomena, Comptes Rendus de l'Académie des Sciences, European Journal for Computational Mechanics, Structural Engineering and Mechanics, Mathematical Problems in Engineering, International Journal of Computer Mathematics, Probabilistic Engineering Mechanics,

Proceedings of the Royal Society A, Reliability Engineering & System Safety, Applied Mathematics Letters

- Thesis reviewer at Ecole Normale Supérieure de Cachan, Université Blaise Pascal, Université de Technologie de Compiègne, Ecole des Mines de Douai, Université de Lille, Université Paris 6, Université Paris 13, University of Brno, Technische Universität Braunschweig, ETH Zurich, Université Paris-Est, Université Paris-Sud, Université Joseph Fourier, Université de La Rochelle, Université de Toulouse, Université de Rennes.
- Expert for the funding program of the French National Research Agency (ANR), Expert for IWT's funding program for Strategic Basic Research (SBO) in Belgium, Expert for the Swiss National Science Foundation, Expert for INRIA.
- Participation to recruiting committees for positions of assistant or full professors in Université de La Rochelle, Université de Nantes, Université Paul Sabatier, Université de Nancy, IFMA Clermont-Ferrand, Ecole Centrale Nantes, Université Paris 6.

Organization of conferences and workshops

- Co-organizer of the international workshop "Numerical methods for high-dimensional problems", Marne-La-Vallée, 2014.
- Co-organizer of the international workshops "Reduced Basis, POD and PGD model reduction techniques": Cachan, November 2012, Blois, November 2013, Cachan November 2015.
- Co-organizer of the workshop "Journées MOMAS Multiphasiques", Nice, 5-7 October 2015.
- Co-organizer of the workshop "TYCHE: modélisations stochastiques en grande dimension pour la propagation et la quantification d'incertitudes en mécanique", Paris, 6-7 December 2012.
- Co-organizer of the national workshop "Journées CSMA 2010", Nantes, 2010.
- Co-organizer of the national conference "JFMS 2008", Nantes 2008.
- Organizer of the working meeting "Stochastic Spectral Methods", IHP, Paris, May 11th 2012
- Co-organizer of minisymposia in international conferences (WCCM 2012 in Brazil, SIAM Linear Algebra 2012 in Spain, SIAM UQ 2014, ICIAM 2015, SIAM UQ 2016, UNCECOMP 2017).
- Co-organizer of minisymposia in national conferences (Giens2009, JFMS2010, MascotNum2012)
- Member of the scientific committee of conferences: CSMA 2011, 2013, 2015 and 2017, JFMS 2010, 2012, 2014 and 2016, UNCECOMP 2015 and 2017, CSMA 2015, Workshop Reduced Basis POD and PGD model reduction techniques 2013 et 2015.

Schools and Tutorials

- Co-organizer of the summer school CEMRACS 2013 ("Modelling and simulation of complex systems: stochastic and deterministic approaches"), CIRM, Marseille, July-August 2013.
- Co-organizer of the Oberwolfach seminar: "Projection Based Model Reduction: Reduced Basis Methods, POD and Low-Rank tensor approximations", Oberwolfach, November 23-29, 2014.
- Co-organizer of the "Workshop CHORUS: A tutorial on Model order reduction for parametric analyses and uncertainty quantification with applications", IHP, Paris, 20 mars 2014.
- Co-organizer of the summer school CEA/EDF/INRIA "Reduced Order Models for numerical simulation", Paris, 20-24 June, 2016.
- Courses in summer schools and tutorials: Conference JFMS, Nantes, 2008; Summer school ECODOQUI November 2008; French-German Summer school, Pforzheim, Germany, August 2011; French-German Summer School, Porquerolles, September 2014; Ateliers ESNT, Saclay, February 2014; Workshop Chorus, March 2014, Oberwolfach Seminar, November 2014; Ateliers ESNT, Saclay, January 2015; Summer school CEA/EDF/INRIA, 20-24 June, 2016. IHP quarter on Numerical Methods for PDEs, Cargese, September 5?9, 2016.

Publications

Book chapters

1. A. Nouy. Low-rank methods for high-dimensional approximation and model order reduction. In P. Benner, A. Cohen, M. Ohlberger, and K. Willcox (eds.), *Model Reduction and Approximation: Theory and Algorithms*. SIAM, Philadelphia, PA, 2016.

2. A. Nouy. Low-Rank Tensor Methods for Model Order Reduction. In R. Ghanem, D. Higdon, H. Owhadi (Eds), *Handbook of Uncertatinty Quantification*. Springer International Publishing, Cham, 2016.

Papers (selected preprints can be found here)

1. P. Ladevèze, A. Nouy, and O. Loiseau. A multiscale computational approach for contact problems. Comput. Meth. App. Mech. Eng., 191:4869–4891, 2002.
2. P. Ladevèze and A. Nouy. A multiscale computational method with time and space homogenization. C. R. Mécanique, 330(10):683–689, 2002.
3. P. Ladevèze and A. Nouy. On a multiscale computational strategy with time and space homogenization for structural mechanics. Comput. Meth. App. Mech. Eng., 192:3061–3087, 2003.
4. A. Nouy and P. Ladevèze. Multiscale computational strategy with time and space homogenization: a radial-type approximation technique for solving micro problems. International Journal for Multiscale Computational Engineering, 170(2):557–574, 2004.
5. H. Yanez-Godoy, F. Schoefs, A. Nouy, and P. Casari. Extreme storm loading on in-service wharf structures. interest of monitoring for reliability updating. European Journal of Environmental and Civil Engineering, 10(5):565–581, 2006.
6. A. Nouy. A generalized spectral decomposition technique to solve a class of linear stochastic partial differential equations. Comput. Meth. App. Mech. Eng., 196(45- 48):4521–4537, 2007.
7. A. Nouy. Méthode de construction de bases spectrales généralisées pour l'approximation de problèmes stochastiques. Mécanique & Industries, 8(3):283–288, 2007.
8. A. Nouy, F. Schoefs, and N. Moës. X-SFEM, a computational technique based on X-FEM to deal with random shapes. European Journal of Computational Mechanics, 16(2):277–293, 2007.
9. A. Nouy. Generalized spectral decomposition method for solving stochastic finite element equations: invariant subspace problem and dedicated algorithms. Comput. Meth. App. Mech. Eng., 197:4718–4736, 2008.
10. A. Nouy, A. Clément, F. Schoefs, and N. Moës. An extended stochastic finite element method for solving stochastic partial differential equations on random domains. Comput. Meth. App. Mech. Eng., 197:4663–4682, 2008.
11. A. Nouy and P. Ladevèze. On a computational strategy with time-space homogenization for heterogeneous materials. Journal of the mechanical behaviour Of materials, 19(2-3):151–158, 2009.
12. A. Nouy and O.P. Le Maître. Generalized spectral decomposition method for stochastic non linear problems. Journal of Computational Physics, 228(1):202–235, 2009.
13. A. Nouy. Recent developments in spectral stochastic methods for the numerical solution of stochastic partial differential equations. Archives of Computational Methods in Engineering, 16(3):251– 285, 2009.
14. F.Chinesta, P. Ladevèze, A. Ammar, E. Cueto, A. Nouy. Proper Generalized Decomposition in Extreme Simulations: Towards a Change of Paradigm in Computational Mechanics? IACM expressions, 26, December 2009.
15. F. Schoefs, A. Clement, and A. Nouy. Assessment of roc curves for inspection of random fields. Structural Safety, 31(5):409–419, 2009.
16. G. Stefanou, A. Nouy, and A. Clément. Identification of random shapes from images through polynomial chaos expansion of random level-set functions. Int. J. for Numerical Methods in Engineering, 79(2):127–155, 2009.
17. A. Nouy. Proper Generalized Decompositions and separated representations for the numerical solution of high dimensional stochastic problems. Archives of Computational Methods in Engineering, 17(4):403–434, 2010.
18. A. Nouy. A priori model reduction through proper generalized decomposition for solving time dependent partial differential equations. Computer Methods in Applied Mechanics and Engineering, 199(23-24):1603–1626, 2010.
19. A. Nouy. Identification of multi-modal random variables through mixtures of polynomial chaos expansions. Comptes Rendus Mécanique, 338(12):698–703, 2010.
20. A. Nouy and A. Clement. extended stochastic finite element method for the numerical simulation

of heterogenous materials with random material interfaces. Int. J. for Numerical Methods in Engineering, 83(10):127–155, 2010.
21. A. Nouy, M. Chevreuil, and E. Safatly. Fictitious domain method and separated representations for the solution of boundary value problems on uncertain parameterized domains. Computer Methods in Applied Mechanics and Engineering, 200(45-46):3066–3082, 2011.
22. A. Falco and A. Nouy. A Proper Generalized Decomposition for the solution of elliptic problems in abstract form by using a functional Eckart-Young approach. Journal of Mathematical Analysis and Applications, 376(2):469–480, 2011.
23. M. Chevreuil and A. Nouy. Model order reduction based on proper generalized decomposition for the propagation of uncertainties in structural dynamics. Int. J. for Numerical Methods in Engineering, 89:241–268, 2012.
24. A. Falcó and A. Nouy. Proper generalized decomposition for nonlinear convex problems in tensor Banach spaces. Numerische Mathematik, 121:503-530, 2012.
25. L. Giraldi, A. Nouy, G. Legrain, and P. Cartraud. Tensor-based methods for numerical homogenization from high-resolution images. Computer Methods in Applied Mechanics and Engineering, 254(0):154-169, 2013.
26. M. Chevreuil, A. Nouy, and E. Safatly. A multiscale method with patch for the solution of stochastic partial differential equations with localized uncertainties. Computer Methods in Applied Mechanics and Engineering, 255(0):255-274, 2013.
27. L. Boucinha, A. Ammar, A. Gravouil and A. Nouy. Ideal minimal residual-based proper generalized decomposition for non-symmetric multi-field models – Application to transient elastodynamics in space-time domain. Computer Methods in Applied Mechanics and Engineering. 273:56-76, 2014.
28. A. Nouy and C. Soize. Random fields representations for stochastic elliptic boundary value problems and statistical inverse problems. European J. of Applied Mathematics, 25(3):339-373, 2014.
29. L. Tamellini, O. Le Maitre, and A. Nouy. Model reduction based on proper generalized decomposition for the stochastic steady incompressible Navier-Stokes equations. SIAM Journal on Scientific Computing, 36(3):A1089–A1117, 2014.
30. M. Billaud-Friess, A. Nouy and O. Zahm. A tensor approximation method based on ideal minimal residual formulations for the solution of high-dimensional problems, ESAIM: Mathematical Modelling and Numerical Analysis, 48:1777-1806, 2014.
31. L. Giraldi, A. Nouy, and G. Legrain. Low-rank approximate inverse for preconditioning tensor-structured linear systems. SIAM Journal on Scientific Computing, 36(4):A1850–A1870, 2014.
32. L. Giraldi, A. Litvinenko, D. Liu, H. G. Matthies, and A. Nouy. To be or not to be intrusive? The solution of parametric and stochastic equations - the "plain vanilla" Galerkin case. SIAM Journal on Scientific Computing. 36(6):A2720-A2744, 2014.
33. . Chevreuil, R. Lebrun, A. Nouy, and P. Rai. A least-squares method for sparse low rank approximation of multivariate functions. SIAM/ASA Journal on Uncertainty Quantification, 3(1):897–921, 2015.
34. A. Falcó, W. Hackbusch, and A. Nouy. Geometric structures in tensor representations (Final Release). arXiv:1505.03027.
35. L. Giraldi, D. Liu, H. G. Matthies, and A. Nouy. To be or not to be intrusive? The solution of parametric and stochastic equations — Proper Generalized Decomposition. SIAM J. Sci. Comp., 37(1):A347-A368, 2015.
36. O. Zahm and A. Nouy. Interpolation of inverse operators for preconditioning parameter-dependent equations. *SIAM Journal on Scientific Computing*, 38(2):A1044–A1074, 2016.
37. M. Billaud-Friess and A. Nouy. Dynamical model reduction method for solving parameter-dependent dynamical systems. arXiv:1604.05706, 2016.
38. O. Zahm, M. Billaud-Friess and A. Nouy. Projection based model order reduction methods for the estimation of vector-valued variables of interest. arXiv:1603.00336, 2016.
39. A. Falco, W. Hackbusch and A. Nouy. On the Dirac-Frenkel Variational Principle on Tensor Banach Spaces. arXiv:1610.09865.