Curriculum Vitae for Jean Roberts

Professional Experience:
Research Director, INRIA (1990-present)
Visiting Associate Professor, Purdue University (1991-1992)
Research Scientist, INRIA (1982-1990)
Research Associate, University of Chicago (1980-1982)
Visiting Assistant Professor, University of Virginia (1978-1979)
Assistant Professor, Oakland University, Michigan (1977-1979)

Education:
HDR (Habilitation à Diriger des Recherches), Université de Paris-Dauphine
Ph. D. in Mathematics, University of Houston
B. S. in Mathematics, University of Georgia

Professional Service:
Member of the Editorial Board for *International Journal of Numerical Analysis and Modeling* (2004-present)
Member of the National Evaluation Committee (for promotion to full professor), Norway (2006-present)
Member of the External Advisory Board of CFSES (Center for Frontiers of Subsurface Energy Security), University of Texas, Austin, Texas, USA, (2010-present)
Member of the External Advisory Board of SimTech (Cluster of Excellence in Simulation Technology), Universität Stuttgart, Germany (2012-present).
Member of the Evaluation Committee at INRIA-Rocquencourt (2005-2008)
Member of the Doctoral and Post Doctoral Fellowships Committee at INRIA-Rocquencourt (2006 - present)
Member of the Détachment and Délégation Committee at INRIA-Rocquencourt (2006 - present)
Vice Chair of SIAM Activity Group Geosciences (2007-2010).
Chairman of the Prize Committee for the SIAM Activity Group Geosciences (2010-2011)
Member of the Nominating Committee for Officers of the SIAM Activity Group Geosciences (2012)
Member of the Organizing Committee for the Third, Fourth and Fifth SIAM-INRIA International Conferences on Mathematical and Numerical Aspects of Wave Propagation (1995, 1998 and 2000)
Member of the Organizing Committee for the Eleventh International Conference on Domain Decomposition (1998)
Member of the Organizing Committee for the SIAM conferences GS05 and GS07
Member of the Scientific Commitee for Interpore2011 and Interpore2012

Ph.D. Students   Clarisse Alboin, *Deux outils mathématiques pour modéliser l'écoulement et le transport de polluants dans un milieu poreux fracturé,* Université de Paris-Dauphine (2000)

Vincent Martin, *Simulations multidomaines des écoulements en milieu poreux,* Université de Paris-Dauphine (2004)

Estelle Marchand, *Analyse de sensibilité déterministe pour la simulation numérique du transfert de contaminants,* Université de Paris-Dauphine (2007)

Laila Amir, *Modèles couplés en milieu poreux fracturé et transport réactif,* Université de Paris-Dauphine (2008)

Najla Frih, *Contributions à la modélisation des écoulements linéaires et non-linéaires dans un milieu poreux fracturé,* Université de Paris-Dauphine and Ecole Nationale de Ingénieurs de Tunis (2009)

Phuong Hoang Thi Thao, Université Pierre et Marie Curie

Fatma Cheikh, Université Pierre et Marie Curie and Ecole Nationale de Ingénieurs de Tunis

Elyes Ahmed, Ecole Nationale de Ingénieurs de Tunis

Current Research Interests: Numerical solution of partial differential equations, in particular methods for modeling flow and transport in porous media

Journal publications

[1] J.E. ROBERTS. – A stronger Borsuk-Ulam type theorem for proper Zp-actions on mod p homology n-spheres. – *Proc. Amer. Mathe. Soc 72*, 2 (November 1978), pp. 381–386. – (link).

[2] J. DOUGLAS, JR. AND J.E. ROBERTS. – Mixed finite element methods for second order eliptic problems. – *Mat. Applic. Comp. 1*, 1 (1982), pp. 91–103. – (Mathscinet).

[3] J. DOUGLAS, JR. AND J.E. ROBERTS. – Numerical methods for a model for compressible miscible displacement in porous media. – *Math. Comp. 41*, 164 (October 1983), pp. 441–459. – (link).

[4] J. DOUGLAS, JR. AND J.E. ROBERTS. – Global estimates for mixed methods for second order eliptic equations. – *Math. Comp. 44 (1985) pp 39-52. 44*, 169 (January 1985), pp. 39–52. – (link).

[5] J. JAFFRÉ AND J.E. ROBERTS. – Upstream weighting and mixed finite elements in the simulation of miscible displacements. – M^2AN *19*, 3 (1985), pp. 443–460. – (Mathscinet).

[6] A. BAMBERGER, B. CHALINDAR, P. JOLY, J. E. ROBERTS, AND J.-L. TERON. – Absorbing boundary conditions for rayleigh waves. – *SIAM J. Stat. Sci. Comp 9*, 6 (November 1988), pp. 1016–1049. – (pdf).

[7] J.-P. Hennart, J. Jaffré, and J.E. Roberts. – A constructive method for deriving finite elements of nodal type. – *Numer. Math. 53*, 6 (November 1988), pp. 701–738. – (link).

[8] A. Bamberger, P. Joly, and J.E. Roberts. – Second order absorbing boundary conditions for the wave equation: a solution for the corner problem. – *SIAM J Numer Anal 27*, 2 (April 1990), pp. 323–352. – (pdf).

[9] G. Chavent and J. E. Roberts. – A unified physical presentation of mixed, mixed-hybrid finite elements and usual finite differences for the determination of velocities in waterflow problems. – *Advances in Water Resources 14*, 6 (December 1991), pp. 329–348. – (link).

[10] J.E. Roberts and J.-M. Thomas. – Mixed and hybrid methods. – *In: Handbook of Numerical Analysis Vol. II, Finite Element Methods (Part 1)*, J.-L. Lyons and P.G. Ciarlet, eds. Elsevier Science Publishers B.V. (North Holland), Amsterdam, 1991, pp. 523–639.

[11] B. Despres, P. Joly, and J.E. Roberts. – A domain decomposition method for the harmonic maxwell equations. – *In: Iterative Methods in Linear Algebra*, R. Beauwens and P. de Groen, eds. Elsevier Science Publishers B.V. (North-Holland), Amsterdam, 1992, pp. 475–484. – (Mathscinet).

[12] J. Douglas, Jr., J.L. Hensley, and J.E. Roberts. – An alternating-direction iteration method for helmholz problems. – *Applications of Mathematics 38*, 4-5 (1993), pp. 289–300. – (Mathscinet).

[13] J. Douglas, Jr., P.-J.S. Paes-Leme, J.E. Roberts, and J. Wang. – A parallel iterative procedure applicable to the approximate solution of second order partial differential equations by mixed finite element methods. – *Numer. Math. 56*, 1 (December 1993), pp. 95–108. – (link).

[14] P. Joly, C Poirier, J.E. Roberts, and P Trouvé. – A new nonconforming finite element method for the computation of electromagnetic guided waves (I) mathematical analysis. – *SIAM J Numer Anal 33*, 4 (1993), pp. 1494–1525. – (pdf).

[15] G. Chavent, K. Kunisch, and J.E. Roberts. – Primal-dual formulation for parameter estimation problems. – *Computational and Applied Mathematics 18*, 2 (1999), pp. 173–229. – (Mathscinet).

[16] G. Cohen, P. Joly, J. E. Roberts, and N. Tordjman. – Higher order triangular finite elements with mass lumping for the wave equation. – *SIAM J Numer Anal 38*, 6 (2001), pp. 2047–2078. – (pdf).

[17] C. Alboin, J. Jaffré, P. Joly, J. E. Roberts, and C. Serres. – A comparison of methods for calculating the matrix block source term in a double porosity model for contaminant transport. – *Comput. Geosci. 6*, 3-4 (September 2002), pp. 523–543. – (link).

[18] V. Martin, J. Jaffré, and J. E. Roberts. – Modeling fractures and barriers as interfaces for flow in porous media. – *SIAM J. Sci. Comput. 26*, 5 (2005), pp. 1667 – 1691. – (pdf).

[19] J. Niessner, R. Helmig, H. Jakobs, and J. E. Roberts. – Interface condition and linearization schemes in the newton iterations for two-phase flow in heterogeneous porous media. – *Advances in Water Resources 28*, 7 (2005), pp. 671–687. – (link).

[20] L. Amir, M. Kern, V. Martin, and J. E. Roberts. – Décomposition de domaine pour un milieu poreux fracturé : un modèle en 3d avec fractures qui s'intersectent. – *ARIMA 5* (2006), pp. 11–25. – (link).

[21] N. Frih, J. E. Roberts, and A. Saada. – Un modèle darcy-forchheimer pour un écoulement dans un milieu poreux fracturé. – *ARIMA 5* (2006), pp. 129–143. – (link).

[22] N. Frih, J. E. Roberts, and A. Saada. – Modeling fractures as interfaces; a model for forchheimer fractures. – *Computational Geosciences 12*, 1 (March 2008), pp. 91–104. – (link).

[23] E. Marchand, F. Clément, J.E. Roberts, and G. Pepin. – Deterministic sensitivity analysis for a model for flow in porous media. – *Advances in Water Resources 31*, 8 (2008), pp. 1025–1037. – (link).

[24] A. Sboui, J. Jaffré, and J. E. Roberts. – A composite mixed finite element for general hexahedral grids. – *SIAM J. Sci. Comput. 31*, 4 (2009), pp. 2623–2645. – (pdf).

[25] N. Frih, V. Martin, J. E. Roberts, and A. Saäda. – Modeling fractures as interfaces with non matching grids. – *submitted* (2011). – (preprint).

[26] J. Jaffré, M. Mnejja, and J. E. Roberts. – A discrete fracture model for two-phase flow with matrix fracture interaction. – *Procedia Computer Science 4*, 0 (2011), pp. 967–973. – (link).

[27] P. Knabner and J. E. Roberts. – Mathematical analysis of a discrete fracture model coupling darcy flow in the matrix with darcy-forchheimer flow in the fracture. – *submitted* (2012). – (preprint).

Publications in conference proceedings

[28] J.E. Roberts. – Some Borsuk-Ulam type theorems. – *In: Geometric Topology*, J. C. Cantrele, ed., Academic Press, New York, 1979, pp. 693–698. (Mathscinet).

[29] P. Joly and J. E. Roberts. – Approximation of the surface impedance for a stratified medium. – *In: Wave Propagation and Inversion*, W. E. Fitzgibbon and M. F. Wheeler, eds., SIAM, 1992, pp. 56–87.

[30] G. Chavent, J. Jaffré, and J. E. Roberts. – Generalized cell-centered finite volume methods : application to two-phase flow in porous media. – *In: Computational Science for the 21st Century*, M.-O. Bristeau, G. Etgen, W. E. Fittzgibbon, J.-L. Lions, J. Périaux, and M. F. Wheeler, eds., John Wiley, Chichester, England, 1997, pp. 231–241.

[31] C. Alboin, J. Jaffré, and J. E. Roberts. – Domain decomposition for flow in porous media with fractures. – *In: Domain decomposition methods in sciences and engineering*, C. H. Lai, P. E. Bjorstad, and M. Cross, eds., Domain Decomposition Press, 1999.

[32] C. Alboin, J. Jaffré, J. E. Roberts, and C. Serres. – Modeling fractures as interfaces for flow and transport in porous media. – *In : Fluid Flow and Transport in Porous Media: Mathematical and Numerical Treatment*, Z. Chen and R.E. Ewing, eds., *Contemporary Mathematics*, *295*, AMS, Providence, RI, 2002, pp. 13–24. (link).

[33] C. Alboin, J. Jaffré, J. E. Roberts, X. Wang, and C. Serres. – Domain decomposition for some transmission problems in flow in porous media. – *In : Numerical Treatment of Multiphase Flows in Porous Media*, Z. Chen, R.E. Ewing, and Z.-C. Shi, eds., Springer Verlag, 2002, pp. 22–34.

[34] I. Ben Gharbia, J. Jaffré, N. S. Kumar, and J. E. Roberts. – Benchmark 3d : a composite hexahedral mixed finite element. – *In : Finite Volumes for Complex Applications VI – Problems & Perspectives*, J. Fort et al., ed., *Springer Proceedings in Mathematics*, *4*, Springer Verlag, Berlin Heidelberg, 2011, pp. 969–976. (link).

Reports (not published elsewhere)

[35] J.E. Roberts and G. Salzano. – Simulation d'écoulement diphasiques compressibles en milieu poreux. – *Report 251*, INRIA, Le Chesnay, France, 1983.