PUBLICATION LIST

by Denis S. GREBENKOV

- *INVITED PAPERS*

  1. D. S. Grebenkov, *Partially Reflected Brownian Motion: A Stochastic Approach to Transport Phenomena*, in "Focus on Probability Theory", Ed. L. R. Velle, pp. 135-169 (Nova Science Publishers, 2006).
     [Electronic version is available on http://arxiv.org/abs/math/0610080]

- *PEER REVIEWED JOURNAL PUBLICATIONS*

  1. D. S. Grebenkov and J. Serror, *Following a Trend with an Exponential Moving Average: Analytical Results for a Gaussian Model* Physica A **394**, 288-303 (2014).

  2. D. S. Grebenkov, M. Vahabi, E. Bertseva, L. Forró, and S. Jeney, *Hydrodynamic and subdiffusive motion of tracers in a viscoelastic medium* Phys. Rev. E **88**, 040701(R) (2013).

  3. D. S. Grebenkov, *Optimal and sub-optimal quadratic forms for non-centered Gaussian processes* Phys. Rev. E **88**, 032140 (2013).

  4. B.-T. Nguyen and D. S. Grebenkov, *Localization of Laplacian eigenfunctions in circular, spherical and elliptical domains*, SIAM J. Appl. Math. **73**, 780-803 (2013).

  5. D. S. Grebenkov and B.-T. Nguyen, *Geometrical structure of Laplacian eigenfunctions* SIAM Reviews **55**, 601-667 (2013).

  6. A. Serov, D. S. Grebenkov, C. Salafia, and M. Filoche, *A geometrical model for searching an optimal villi density in the inter-villous cross-sections of the human placenta*, Placenta **34**, A93-A94 (2013).

  7. D. S. Grebenkov, H. T. Nguyen, and J.-R. Li, *A fast random walk algorithm for computing diffusion-weighted NMR signals in multi-scale porous media: a feasibility study for a Menger sponge*, Micropor. Mesopor. Mater. **178**, 56-59 (2013).
     M. Nordin, D. S. Grebenkov, M. N. Jacobi, and M. Nyden, *An efficient eigenfunction approach to calculate spin-echo signals in heterogeneous porous media*, Micropor. Mesopor. Mater. **178**, 7-10 (2013).

  8. D. V. Nguyen, D. S. Grebenkov, C. Poupon, D. Le Bihan, and J.-R. Li, *Effective diffusion tensor computed by homogenization*, Diff. Fundam. **18** (9), 1-6 (2013).

  9. S. Valeyre, D. S. Grebenkov, S. Aboura and Q. Liu, *The Reactive Volatility Model* (accepted to Quant. Finance)

  10. J.-F. Rupprecht, O. Bénichou, D. S. Grebenkov, and R. Voituriez, *Exact mean exit time for surface-mediated diffusion*, Phys. Rev. E **86**, 041135 (2012).

  11. A. L. Delitsyn, B.-T. Nguyen, and D. S. Grebenkov, *Exponential decay of Laplacian eigenfunctions in domains with branches of variable cross-sectional profile* Eur. Phys. J. B **85**, 371 (2012).

  12. E. Bertseva, D. S. Grebenkov, P. Schmidhauser, S. Gribkova, S. Jeney, and L. Forró, *Optical Trapping Microrheology in Cultured Human Cells*, Eur. Phys. J. E **35**, 63 (2012).

  13. A. Andreanov and D. S. Grebenkov, *Time-averaged MSD of Brownian motion* J. Stat. Mech. P07001 (2012).

14. J.-F. Rupprecht, O. Bénichou, D. S. Grebenkov, and R. Voituriez, *Kinetics of active surface-mediated diffusion in spherically symmetric domains*, J. Stat. Phys. **147**, 891-918 (2012).

15. T. Calandre, O. Bénichou, D. S. Grebenkov, and R. Voituriez, *The interfacial territory covered by surface-mediated diffusion*, Phys. Rev. E **85**, 051111 (2012).

16. A. Rozanova-Pierrat, D. S. Grebenkov, and B. Sapoval, *Faster Diffusion across an Irregular Boundary*, Phys. Rev. Lett. **108**, 240602 (2012).

17. J. Gill, D. Vvedensky, C. Salafia, D. S. Grebenkov, and S. VanHorn, *Correlations between intravillous screening and placental functional efficiency: the influence of villous capillary geometry onto oxygen transport flux*, Placenta **33**, A18 (2012).

18. A. L. Delitsyn, B.-T. Nguyen, and D. S. Grebenkov, *Trapped modes in finite quantum waveguides*, Eur. Phys. J. B **85**, 176 (2012).

19. J. S. Gill, C. M. Salafia, D. S. Grebenkov, D. D. Vvedensky, *Modelling oxygen transport in human terminal villi*, J. Theor. Biol. **291**, 33-41 (2011).

20. D. S. Grebenkov, *Probability Distribution of the Time-Averaged Mean-Square Displacement of a Gaussian Process*, Phys. Rev. E **84**, 031124 (2011).

21. D. S. Grebenkov, *Time-Averaged Quadratic Functionals of a Gaussian Process*, Phys. Rev. E **83**, 061117 (2011).

22. O. Bénichou, D. S. Grebenkov, P. Levitz, C. Loverdo, R. Voituriez, *Mean first-passage time of surface-mediated diffusion in spherical domains*, J. Stat. Phys. **142**, 657-685 (2011).

23. D. S. Grebenkov, *A fast random walk algorithm for computing the pulsed-gradient spin-echo signal in multiscale porous media*, J. Magn. Reson. **208**, 243-255 (2011).

24. D. S. Grebenkov, *Pulsed-Gradient Spin-Echo Monitoring of Restricted Diffusion in Multilayered Structures: Challenges and Solutions*, AIP Conf. Proc. **1330**, 65-68 (2011).

25. O. Bénichou, D. S. Grebenkov, P. Levitz, C. Loverdo, R. Voituriez, *Optimal Reaction Time for Surface-Mediated Diffusion*, Phys. Rev. Lett. **105**, 150606 (2010).

26. B. T. Nguyen, D. S. Grebenkov, *A Spectral Approach to Survival Probability in Porous Media*, J. Stat. Phys. **141**, 532-554 (2010).

27. D. S. Grebenkov, *Pulsed-gradient spin-echo monitoring of restricted diffusion in multilayered structures*, J. Magn. Reson. **205**, 181-195 (2010).

28. D. G. Grebenkov, *Subdiffusion in a bounded domain with a partially absorbing/reflecting boundary* Phys. Rev. E **81**, 021128 (2010).

29. D. G. Grebenkov, *Searching for partially reactive sites: Analytical results for spherical targets*, J. Chem. Phys. **132**, 034104 (2010).

30. D. S. Grebenkov, *Use, Misuse and Abuse of Apparent Diffusion Coefficients*, Conc. Magn. Reson. A**36**, 24-35 (2010).

31. D. S. Grebenkov, Y. A. Goddard, G. Diakova, J.-P. Korb, and R. G. Bryant, *Dimensionality of Diffusive Exploration at the Protein Interface in Solution* J. Phys. Chem. B **113**, 13347-13356 (2009).

32. D. S. Grebenkov, *Laplacian Eigenfunctions in NMR. II Theoretical Advances*, Conc. Magn. Reson. A **34**, 264-296 (2009).

33. D. S. Grebenkov, *Laplacian Eigenfunctions in NMR I. A Numerical Tool*, Conc. Magn. Reson. A **32**, 277-301 (2008).

34. M. Filoche, D. S. Grebenkov, J. S. Andrade Jr., B. Sapoval, *Passivation of Irregular Surfaces Accessed by Diffusion*, Proc. Natl. Acad. Sci. **105**, 7636-7640 (2008).

35. D. S. Grebenkov, M. Pica Ciamarra, M. Nicodemi, A. Coniglio, *Flow, Ordering and Jamming of Sheared Granular Suspensions*, Phys. Rev. Lett. **100**, 078001 (2008).

36. D. S. Grebenkov, *Analytical solution for restricted diffusion in circular and spherical layers under inhomogeneous magnetic fields*, J. Chem. Phys. **128**, 134702 (2008).

37. D. Habib, D. S. Grebenkov, G. Guillot, *Gas diffusion in a pulmonary acinus model: experiments with hyperpolarized helium-3*, Magn. Reson. Imaging **26**, 1101 (2008).

38. M. Filoche, D. S. Grebenkov, *The toposcopy, a new tool to probe the geometry of an irregular interface by measuring its transfer impedance*, Eur. Phys. Lett. **81**, 40008 (2008).

39. D. S. Grebenkov, *NMR survey of reflected Brownian motion*, Rev. Mod. Phys. **79**, 1077-1137 (2007).

40. D. S. Grebenkov, *Residence times and other functionals of reflected Brownian motion*, Phys. Rev. E **76**, 041139 (2007).

41. D. S. Grebenkov, *Multiple Correlation Function Approach: Rigorous Results for Simple Geometries*, Diff. Fundam. **5**, 1-34 (2007).

42. D. S. Grebenkov, G. Guillot, B. Sapoval, *Restricted Diffusion in a Model Acinar Labyrinth by NMR. Theoretical and Numerical Results*, J. Magn. Reson. **184**, 143-156 (2007).

43. D. S. Grebenkov, *Nuclear Magnetic Resonance Restricted Diffusion between Parallel Planes in a Cosine Magnetic Field: An Exactly Solvable Model*, J. Chem. Phys. **126**, 104706 (2007).

44. D. S. Grebenkov, M. Filoche, B. Sapoval, *A Simplified Analytical Model for Laplacian Transfer Across Deterministic Prefractal Interfaces*, Fractals **15**, 27-39 (2007).

45. D. S. Grebenkov, *Multiple correlation function approach to study the restricted diffusion under arbitrary magnetic field*, Magn. Reson. Imag. **25**, 559 (2007).

46. D. S. Grebenkov, G. Guillot, *NMR of diffusion in porous media: branched or disordered structure?*, Magn. Reson. Imag. **25**, 560 (2007).

47. D. Habib, D. S. Grebenkov, G. Guillot, *Probing a model pulmonary acinus by NMR gas diffusion*, Magn. Reson. Imag. **25**, 560 (2007).

48. P. Levitz, D. S. Grebenkov, M. Zinsmeister, K. Kolwankar, B. Sapoval, *Brownian flights over a fractal nest and first passage statistics on irregular surfaces*, Phys. Rev. Lett. **96**, 180601 (2006).

49. D. S. Grebenkov, *Multiexponential attenuation of the CPMG spin echoes due to a geometrical confinement*, J. Magn. Reson. **180**, 118-126 (2006).

50. D. S. Grebenkov, M. Filoche, B. Sapoval, *Mathematical Basis for a General Theory of Laplacian Transport towards Irregular Interfaces*, Phys. Rev. E **73**, 021103 (2006).

51. D. S. Grebenkov, *Scaling Properties of the Spread Harmonic Measures*, Fractals **14** (3), 231-243 (2006).

52. D. S. Grebenkov, *What Makes a Boundary Less Accessible*, Phys. Rev. Lett. **95**, 200602 (2005).

53. D. S. Grebenkov, M. Filoche, B. Sapoval, M. Felici, *Diffusion-Reaction in Branched Structures: Theory and Application to the Lung Acinus*, Phys. Rev. Lett. **94**, 050602 (2005).

54. D. S. Grebenkov, A. A. Lebedev, M. Filoche, B. Sapoval, *Multifractal Properties of the Harmonic Measure on Koch Boundaries in Two and Three Dimensions*, Phys. Rev. E **71**, 056121 (2005).

55. B. Sapoval, J. S. Andrade Jr, A. Baldassari, A. Desolneux, F. Devreux, M. Filoche, D. S. Grebenkov, S. Russ, *New Simple Properties of a Few Irregular Systems*, Physica A **357** (1), 1-17 (2005).

56. D. S. Grebenkov, G. Guillot, *Numerical MRI of the translational diffusion in branching three-dimensional labyrinths of a model pulmonary acinus*, MAGMA **18**, S128 (2005).

57. D. S. Grebenkov, M. Filoche, B. Sapoval, *Spectral Properties of the Brownian Self-Transport Operator*, Eur. Phys. J. B **36** (2), 221-231 (2003).

58. A. P. Grinin, D. S. Grebenkov, *Study of Relaxation in Micellar Solution by the Numerical Experiment*, Colloid Journal **65** (5), 552-561 (2003).

59. D. S. Grebenkov, *Parametric Equations of the Theory of Formation of Spherical Micelles*, J. Coll. Int. Sci. **249**, 162-171 (2002).

60. D. S. Grebenkov, A. P. Grinin, *Numerical Simulation of Transitive Processes of Micellization*, Vestnik Sankt-Peterburgskogo Universiteta, Series 4, **4** (28), 3-12 (2001).

61. D. S. Grebenkov, A. P. Grinin, F. M. Kuni, *Numerical Verification of the Accuracy of Some Analytical Results in the Nucleation Theory*, Vestnik Sankt-Peterburgskogo Universiteta, Series 4, **2** (11), 3-10 (1999).

- *INVITED CONFERENCES*

  1. Invited keynote lecture *"Diffusion in porous media"* at the 9th International Bologna Conference on Magnetic Resonance in Porous Media (July 13, 2008, Cambridge MA, USA).

  2. Invited talk *"Diffusion, reaction, and spin-echo signal attenuation in branched structures"* at long-term program "Optimal Transport" at the Institute for Pure and Applied Mathematics (May 22, 2008, Los Angeles CA, USA).

  3. Invited tutorial lecture *"Modelling of the Respiratory System and Diffusion-Weighted Imaging"* at PHeLINet General training school on Lung Imaging with Hyperpolarised Helium-3 Magnetic Resonance (January 21-26, 2008, Paris, France)

  4. Invited talk *"Harmonic Measure and Passivation of 2D and 3D Fractals"* at long-term program "Random Shapes" at the Institute for Pure and Applied Mathematics (April 19, 2007, Los Angeles CA, USA).

  5. Invited tutorial lecture *"Laplacian transport towards irregular surfaces: the mathematics"* at long-term program "Random Shapes" at the Institute for Pure and Applied Mathematics (March 12, 2007, Los Angeles CA, USA).

- *PEER REVIEWED CONFERENCE PUBLICATIONS*

  1. D. S. Grebenkov, H. T. Nguyen, J.-R. Li, *A fast random walk algorithm for computing diffusion-weighted NMR signals in multi-scale porous media: a feasibility study for a Menger sponge*, Proceedings of the 11th International Bologna Conference on Magnetic Resonance in Porous Media (Guilford, Great Britain, 2012).

  2. M. Nordin, D. S. Grebenkov, M. N. Jacobi, M. Nyden, *An efficient eigenfunction approach to calculate spin-echo signals in heterogeneous porous media*, Proceedings of the 11th International Bologna Conference on Magnetic Resonance in Porous Media (Guilford, Great Britain, 2012).

  3. D. V. Nguyen, D. S. Grebenkov, C. Poupon, D. Le Bihan, and J.-R. Li, *Effective diffusion tensor computed by homogenization*, Proceedings of the 11th International Bologna Conference on Magnetic Resonance in Porous Media (Guilford, Great Britain, 2012).

  4. J. Gill, D. Vvedensky, C. Salafia, D. S. Grebenkov, and S. VanHorn, *Correlations between intravillous screening and placental functional efficiency: the influence of villous capillary geometry onto oxygen transport flux*, International Federation of Placenta Associations Meeting 2012 (Hiroshima, Japan, September 2012).

  5. J.-R. Li, D. S. Grebenkov, C. Poupon, D. Le Bihan, *An approximate analytical formula for the long time apparent diffusion coefficient*, Proceedings of the 20th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), #1840 (Melbourne, Australia, May 2012).

  6. D. V. Nguyen, D. S. Grebenkov, C. Poupon, D. Le Bihan, J.-R. Li, *Effective diffusion tensor computed by homogenization*, Proceedings of the 20th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), #1843 (Melbourne, Australia, May 2012).

  7. E. Bertseva, D. S. Grebenkov, S. Jeney and L. Forro, *Optical trapping microrheology in cultured human cells*, Proc. 8th EBSA European Biophysics Congress (Budapest, Hungary, 23-27 August 2011).

8. J. S. Gill, D. S. Grebenkov, C. M. Salafia, and D. Vvedensky, *Diffusive Oxygen Fluxes to Capillaries within the Human Placenta*, Proceedings of 18th Meeting of the Japan-Placenta Association (Kumamoto, Japan, 2010); published in Placenta **31**, A41 (2010).

9. J. S. Gill, D. S. Grebenkov, C. M. Salafia, D. P. Misra and D. Vvedensky, *Functional Analysis of Capillaries within Villi of the Human Placenta: Area, Flux, and Birth Weight, Placental Weight and Gestation Age*, Proceedings of 18th Meeting of the Japan-Placenta Association (Kumamoto, Japan, 2010); published in Placenta **31**, A21 (2010).

10. J. S. Gill, D. S. Grebenkov, C. M. Salafia, and D. Vvedensky, *Diffusional Screening of Capillaries within Villi of the Human Placenta*, Proceedings of 18th Meeting of the Japan-Placenta Association (Kumamoto, Japan, 2010); published in Placenta **31**, A20 (2010).

11. M. Sarracanie, X. Maître, A. Caluch, R. Santarelli, R.-M. Dubuisson, L. Darrasse, B. Louis, R. Fodil, E. Boriasse, F. Marsolat, D. S. Grebenkov, M. Filoche, B. Sapoval, G. Caillibotte, G. Apiou, D. Isabey, E. Durand, and J. Bittoun, *Assessment of hyperpolarised helium-3 MRI for aerosol deposition in the lungs*, Proceedings of the 25th Annual Meeting of the ESMRMB, # 959 (Valencia, Spain, 2008).

12. D. S. Grebenkov, *An exactly solvable model for restricted diffusion in NMR*, Proceedings of the XXIII IUPAP International Conference on Statistical Physics, p. 174 (Genoa, Italy, 2007).

13. D. S. Grebenkov, *Multiple correlation function approach to study the restricted diffusion under arbitrary magnetic field*, Proceedings of the 8th International Bologna Conference on Magnetic Resonance in Porous Media, p. 54 (Bologna, Italy, 2006).

14. D. S. Grebenkov, G. Guillot, *NMR of diffusion in porous media: branched or disordered structure?*, Proceedings of the 8th International Bologna Conference on Magnetic Resonance in Porous Media, p. 55 (Bologna, Italy, 2006).

15. D. Habib, D. S. Grebenkov, G. Guillot, *Probing a model pulmonary acinus by NMR gas diffusion*, Proceedings of the 8th International Bologna Conference on Magnetic Resonance in Porous Media, p. 55 (Bologna, Italy, 2006).

16. D. S. Grebenkov, G. Guillot, *Localization regime of restricted diffusion in a model pulmonary acinus*, Proceedings of the Fourteenth ISMRM Meeting, # 1624 (Seattle, USA, 2006).

17. D. Habib, D. S. Grebenkov, X. Maître, L. De Rochefort, E. Durand, G. Guillot, *Experimental study of gas diffusion in a pulmonary acinus model*, Proceedings of the Fourteenth ISMRM Meeting, # 1323 (Seattle, USA, 2006).

18. D. S. Grebenkov, G. Guillot, *Numerical MRI of the translational diffusion in branching three-dimensional labyrinths of a model pulmonary acinus*, Proceedings of the 22th Annual Meeting of ESMRMB, # 219 (Basle, Switzerland, 2005).

19. D. S. Grebenkov, E. Chassaing, M. Filoche, B. Sapoval, *Rôle de l'irrégularité géométrique d'une électrode : approche théorique et vérification expérimentale*, Proceedings of the 17th Forum of Electrochemical Impedances, pp. 183-192 (Paris, France, 2005).

20. D. S. Grebenkov, *Numerical Study of the Multifractal Properties of the Harmonic Measure on a Cubic Koch Surface*, in Proceedings of Europhysics Conference on Computational Physics (ed. by G. Ciccotti), p. 121 (Genoa, Italy, 2004).

21. D. S. Grebenkov, *Approximate Distribution of Hitting Probabilities for a Regular Surface with Compact Support in 2D*, Proceedings of the European Summer School 2001 "Asymptotic Combinatorics with Application to Mathematical Physics", 221-242 (Saint Petersburg, Russia, 2002).

- *SUBMITTED PAPERS*

  J. R. Li, D. Le Bihan, T. Q. Nguyen, D. S. Grebenkov, C. Poupon, and H. Haddar, *Analytical and numerical study of the apparent diffusion coefficient in diffusion MRI at long diffusion times and low b-values* (submitted to J. Magn. Reson.)

  1. M. Sarracanie, D. S. Grebenkov, J. Sandeau, S. Coulibaly, A. R. Martin, K. Hill, J. M. Pérez Sánchez, L. Martin, E. Durand, G. Caillibotte, D. Isabey, L. Darrasse, J. Bittoun, and X. Maître, *Hyperpolarized helium-3 MRI as a new tool to quantify aerosol deposition* (submitted to Magn. Reson. Med.)

  2. F. Cadiz, D. Paget, A. C. H. Rowe, J.-P. Korb, D. S. Grebenkov, P. Barate, S. Arscott, and E. Peytavit, *Effect of Pauli blockade on spin-dependent diffusion in degenerate semi-conductors* (submitted).

  3. D. V. Nguyen, J.-R. Li, and D. S. Grebenkov, *A finite elements method to solve the Bloch-Torrey equation applied to diffusion magnetic resonance imaging* (submitted to J. Comput. Phys.)

  4. A. Serov, D. S. Grebenkov, C. Salafia, and M. Filoche, *Optimal villous density for maximal oxygen uptake in the human placenta* (submitted to Placenta)

  5. T. Calandre, O. Bénichou, D. S. Grebenkov, and R. Voituriez, *Splitting probabilities and interfacial territory covered by 2D and 3D surface-mediated diffusion* (submitted to Phys. Rev. E)

  6. D. S. Grebenkov and M. Vahabi, *Analytical solution of the generalized Langevin equation with hydrodynamic interactions: subdiffusion of heavy tracers*, (submitted to Phys. Rev. E)

- *INTERNATIONAL CONFERENCES*

  1. D. S. Grebenkov, *Diffusion-Reaction in Branched Structures: Theory and Application to the Lung Acinus*, Conference on Practical Applications of Fractals, Trieste, Italy, 2004.

  2. D. S. Grebenkov, *Diffusive Transport towards Irregular Interfaces: from Numerical Simulations to Experimental Studies*, Conference on Physics Survey of Irregular Systems, Fortaleza, Brazil, 2004.

  3. A. P. Grinin, D. S. Grebenkov, *Time Evolution of Ensembles of Molecular Aggregates in a Micellar Solution after an Instantaneous Change of the Thermodynamic Parameters*, VII Research Workshop "Nucleation Theory and Applications", Dubna, Russia, 2003.

  4. D. S. Grebenkov, *Study of the Brownian Self-Transport Operator*, TMR Network Meeting "Fractal Structures and Self-Organization", Anacapri, Italy, 2002.

- *LOCAL CONFERENCES*

  1. D. S. Grebenkov, *Modélisation de la diffusion restreinte dans un labyrinthe tridimensionnel de l'acinus pulmonaire*, 11ème Journées Simulation Numérique, Paris, France, 2005.

  2. D. S. Grebenkov, *Diffusion-réaction sur des structures arborescentes : théorie et applications*, 25ème Rencontre de Physique Statistique, Paris, France, 2005.

  3. D. S. Grebenkov, *Etude numérique des propriétés multifractales de la mesure harmonique sur une surface de Koch*, 10ème Journées simulation numérique, matière condensée et désordre, interface simulation-expérience, Paris, France, 2004.

4. D. S. Grebenkov, *Phénomènes de transport laplacien : approches théoriques et numériques*, 24ème Rencontre de Physique Statistique, Paris, France, 2004.