

Curriculum vitae

Personal data

Jing-Rebecca Li
Email: jingrebecca.li@inria.fr
Tel: +33 1 69 33 46 35 ; +33 6 42 07 12 49
Web-page: <http://www.cmap.polytechnique.fr/~jingrebecali/>
Address : INRIA-Saclay, Equipe DEFI, CMAP, Ecole Polytechnique
91128 Palaiseau Cedex, France



Education

10/2013, HDR (Habilitation à Diriger des Recherches)
Université Paris-Sud, Orsay, France
Topic: *Modelisation et simulation de la diffusion*

09/2000, Ph.D. in Applied Mathematics
Massachusetts Institute of Technology, Cambridge, MA, USA
Thesis topic: *Efficient model reduction of large linear systems.*
Thesis supervisor: Prof. Jacob White (Research Laboratory of Electronics, MIT).

05/1995, Bachelor of Science in Honors Mathematics
University of Michigan, Ann Arbor, MI, USA
With Highest Distinction

Training

10/2017 – 09/2018, *Formation à la thérapie interpersonnelle basée sur l'attachement*,
Association Française de Thérapie Interpersonnelle, Paris, France

11/2017, *Reflective Functioning Evaluation of the Adult Attachment Interview*, Anna Freud National
Centre for Children and Families, London, UK

Employment

11/2003 – present, Research Scientist
Institut National de Recherche en Informatique et en Automatique (INRIA)
INRIA-Saclay, France

09/2000 – 09/2003, Post-Doctoral Researcher
Courant Institute of Mathematical Sciences, New York, NY, USA

Research Experience

07/2010 – present, member of Equipe DEFI, INRIA-Saclay, France
Diffusion MRI, Numerical PDEs, EEG, Psychology

10/2008 – present, external collaborator at Neurospin, Saclay, France
Modeling and simulation of diffusion MRI in biological tissue

11/2003 – 06/2010, member of Equipe POEMS, INRIA-Rocquencourt, France
Time-stepping schemes for evaluating fractional integrals and derivatives.
Artificial boundary conditions for periodic waveguides with local perturbations.
Simulation of dendritic solidification using the phase field model.

09/2000 – 09/2003, Courant Institute of Mathematical Sciences, New York, USA
Efficient numerical solution of the diffusion equation
Explicit time-stepping schemes for the wave equation in complex geometry
Artificial boundary conditions for the wave equation.

09/1996 – 08/2000, Research Lab. of Electronics, MIT, Massachusetts, USA
Numerical linear algebra, Reduced models for on-chip interconnect modeling

Teaching

07/2018, Co-organizer of the summer school Ecole d'Été France Excellence, *Data Science for Document Analysis and Understanding*, supported by the French Embassy in China.

09/2017, Lecturer of *Mathematical and numerical foundations of modeling and simulation using partial differential equations*, French-Vietnam Master in Applied Mathematics, University of Science, Ho Chi Minh City, Vietnam.

07/2017, Organizer of the summer school Ecole d'Été France Excellence, *Mathematical and computational methods for life sciences*, supported by the French Embassy in China.

1995-2007, Ecole Nationale Supérieure de Techniques Avancées, Ecole des Mines, New York University, Massachusetts Institute of Technology.

Graduate level supervision

- Ph.D. of Jingjing Hao (10/2017 – present). Topic: *Algorithm and software development for analysis and classification of EEG measurements during administration of neuropsychological tests for AD/HD*. Co-advisor: Hassan Rahioui.
- Ph.D. of Khieu Van Nguyen (02/2014 – 04/2017). Topic: *Modeling, simulation and experimental verification of water diffusion in neuronal network of the Aplysia ganglia*. Co-advisor: Luisa Ciobanu.
- Ph.D. of Simona Schiavi (09/2013 – 12/2016). Topic: *Homogenized models for diffusion MRI*. Co-advisor: Housseem Haddar.
- Ph.D. of Gabrielle Fournet (11/2013 – 11/2016). Topic: *Computational imaging of the aging cerebral microvasculature*. Co-advisor: Luisa Ciobanu.
- Ph.D. of Hang Tuan Nguyen (10/2010 – 01/2014). Topic: *Tissue parameters estimation for dMRI signals in biological tissue*. Co-advisors: Cyril Poupon and Denis Grebenkov.
- Ph.D. of Dang Van Nguyen (10/2010 – 01/2014). Topic: *Efficient finite elements code for the simulation of dMRI signals in complex geometry*. Co-advisor: Denis Grebenkov.
- Post-doc of Imen Mekkaoui (11/2017 – present). Topic: *In-vivo cardiac diffusion magnetic resonance imaging: simulations and parameters estimation*. Collaborators: Jan Hesthaven (EPFL), Jerome Pousin (Université de Lyon, INSA de Lyon).
- Post-doc of Fabien Caubet (01/2013-08/2013). Topic: *New transmission condition accounting for diffusion anisotropy in thin layers applied to diffusion MRI*. Co-supervisor: Housseem Haddar.
- Post-doc of Julien Coatleven (03/2012–08/2012). Topic: *Asymptotic models for multiple compartments diffusion using mathematical homogenization*. Co-supervisor: Housseem Haddar.
- Numerous Master level internships.

Grants

- Coordinator of the project *Simulation of diffusion MRI signals in biological tissue*, funded by Agence Nationale de la Recherche (French National Research Agency) in the program COSINUS 2010. Partners: INRIA (200K euros) and Neurospin (200K euros). Duration: Nov 2010-Jan 2014.
- Partner coordinator of the project *Computational imaging of the aging cerebral microvasculature*, funded by Agence Nationale de la Recherche in the program US-French Collaboration. Partners: INRIA (132K euros) and Neurospin (160K euros) and Univ of Illinois Dept of Bio-Engineering. Duration: Sept 2013-Feb 2017.

Service to the community/Organization

- Member of the SIAM *Committee on Programs and Conferences*, 2017-present.
- Organizer of *Ecole d'Été France Excellence*, summer school for Chinese students, sponsored by the French Embassy in China, Palaiseau, France, 07/2017, 07/2018.
- Member of Organizing Committee of Society for Industrial and Applied Mathematics (SIAM) *Conference on Computational Science and Engineering*, 2017.

- Chair of *Student Careers Panel*, SIAM CSE Conference, 2017.
- Organizer of mini-symposium *New Developments in time-stepping strategies for diffusive-type differential equations*, SIAM Conference on Computational Science and Engineering, 2017
- Reviewer for *Millennium Science Initiative*, a program of the Government of Chile, 2017.
- Responsible for Ecole Polytechnique of the *France-Vietnam Master's program in Applied Mathematics*, 2016-present.
- Member of Scientific Committee of Conference *Analysis, probability, from theory to industrial applications : ten years of the French-Vietnamese Master in Applied Mathematics*, 2016.
- Member of INRIA *Comité Parité et Egalité*, 2016-present.
- Member of INRIA *Commission d'Evaluation*, 2015-present.
- Evaluator for European Commission Horizon 2020 call *FET-OPEN*, 2015.
- Associate editor of Society for Industrial and Applied Mathematics (SIAM) Journal on Scientific Computing, 2010-2015.
- Organizer of mini-symposium *Physics and mathematics of diffusion magnetic resonance imaging*, SMAI (French Applied Math Society) Annual Meeting, 2015.
- Organizer of mini-symposium *Simulation and modeling applied to diffusion magnetic resonance imaging*, SIAM Conference on Computational Science and Engineering, 2013
- Organizer of mini-symposium *Advances in applied numerical methods for complex applications*, International Congress on Industrial and Applied Mathematics (ICIAM), 2011.
- Member of organizing committee of *WAVES*, 2007.
- Editor of special issue of Journal of Computational and Applied Mathematics for the International Conference on Mathematical and Numerical Aspects of Waves (WAVES), 2007.

Prizes and Awards

- Invited speaker at the Workshop *Fast Algorithms for Generating Static and Dynamically Changing Point Configurations*, Institute for Computational and Experimental Research in Mathematics, 2018.
- Invited speaker at the *Conference of Groupe d'Etude de Résonance Magnétique (GERM)*, 2015.
- Article Low rank solution of Lyapunov equations chosen as a SIGEST Selection in SIAM Review, 2004, as one of the best papers published in SIAM journals in the previous two years.
- Alston Householder Award for the best dissertation in Numerical Algebra, 2002. *The Householder Award is given every three years. It was established at the 1969 Gatlinburg Symposium (now renamed the Householder Symposium) to recognize the outstanding contributions of Alston S. Householder (1904-1993) to numerical analysis and linear algebra.*
- Leslie Fox Prize in Numerical Analysis, Second Prize, 2001. *The Leslie Fox Prize for Numerical Analysis of the Institute of Mathematics and its Applications (IMA) is a biennial prize established in 1985 by the Institute of Mathematics and its Applications (IMA) in honour of mathematician Leslie Fox (1918-1992). The prize honours "young numerical analysts worldwide" (any person who is less than 31 years old), and applicants submit papers for review. A committee reviews the papers, invites shortlisted candidates to give lectures at the Leslie Fox Prize meeting, and then awards First Prize and Second Prizes based on "mathematical and algorithmic brilliance in tandem with presentational skills."*
- Semiconductor Research Corp. Graduate Fellowship, 1999-2000.
- National Science Foundation Graduate Fellowship, 1995-1998.
- Winner of Alice T. Schafer Prize (given by Assoc. for Women in Mathematics), 1994.

Publications (journals and refereed conferenced proceedings)

1. G. Fournet, J.-R. Li, D. Le Bihan, L. Ciobanu. *The influence of acquisition parameters on the metrics of the bi-exponential IVIM model*. Submitted.
2. D. V. Nguyen, J. Jansson, J. Hoffman, J.-R. Li. *An extended finite element method for computational diffusion MRI*. Submitted.
3. H. Haddar, J.-R. Li, S. Schiavi. *Understanding the time-dependent diffusion tensor measured by diffusion MRI: the intra-cellular case*. SIAM Journal of Applied Mathematics. 2017.

4. P. Svehla, K. V. Nguyen, J.-R. Li, L. Ciobanu. *Quantitative DLA-based compressed sensing for T1-weighted acquisitions*. Journal of Magnetic Resonance. 2017.
5. G. Fournet, J.-R. Li, A. Cerjanic, B. Sutton, L. Ciobanu, D. Le Bihan. *A two pool model to describe the IVIM cerebral perfusion*. Journal of Cerebral Blood Flow and Metabolism. 2016.
6. H. Haddar, J.-R. Li, S. Schiavi. *A macroscopic model for the diffusion MRI signal accounting for time-dependent diffusivity*. SIAM Journal of Applied Mathematics. 2016.
7. H. Haddar, J.-R. Li, S. Schiavi. *Adapting the Kärger model to account for finite diffusion-encoding pulses in diffusion MRI*. IMA Journal of Applied Mathematics. 2016.
8. F. Caubet, H. Haddar, J.-R. Li, D. V. Nguyen. *New transmission condition accounting for diffusion anisotropy in thin layers applied to diffusion MRI*. ESAIM: Mathematical Modelling and Numerical Analysis. 2016.
9. K. V. Nguyen, J.-R. Li, G. Radecki, L. Ciobanu. *DLA based compressed sensing for high resolution MR microscopy of neuronal tissue*. Journal of Magnetic Resonance. 2015.
10. H. T. Nguyen, D. Grebenkov, D. V. Nguyen, C. Poupon, D. Le Bihan, J.-R. Li. *Parameter estimation using macroscopic diffusion MRI signal models*. Physics in Medicine and Biology. 2015.
11. D. V. Nguyen, D. Grebenkov, D. Le Bihan, J.-R. Li. *Numerical study of a cylinder model of the diffusion MRI signal for neuronal dendrite trees*. Journal of Magnetic Resonance. 2015.
12. J.-R. Li, H. T. Nguyen, D. V. Nguyen, H. Haddar, J. Coatleven, D. Le Bihan. *Numerical study of a macroscopic finite pulse model of the diffusion MRI signal*, Journal of Magnetic Resonance. 2014.
13. D. Grebenkov, D. V. Nguyen, J.-R. Li. *Exploring diffusion across permeable barriers at high gradients. I. Narrow pulse approximation*, Journal of Magnetic Resonance. 2014.
14. D. Nguyen, J.-R. Li, D. Grebenkov, D. Le Bihan. *A finite elements method to solve the Bloch-Torrey equation applied to diffusion magnetic resonance imaging*, Journal of Computational Physics. 2014.
15. J. Coatleven, H. Haddar, J.-R. Li. *A new macroscopic model including membrane exchange for diffusion MRI*, SIAM Journal of Applied Mathematics. 2014.
16. M. Iima, O. Reynaud, T. Tsurugizawa, L. Ciobanu, J.-R. Li, F. Geffroy, B. Djemai, M. Umehana, D. Le Bihan. *Non-Gaussian diffusion MRI assessment of microstructure in rat brain 9L glioma model*, Investigative Radiology. 2014.
17. J.-R. Li, D. Calhoun, C. Poupon, D. Le Bihan. *Numerical simulation of diffusion MRI signals using an adaptive, time-stepping method*. Physics in Medicine and Biology. 2013.
18. D. Grebenkov, H. T. Nguyen, J.-R. Li. *A fast random walk algorithm for computing diffusion-weighted NMR signals in multiscale porous media: a feasibility study for a Menger sponge*, Microporous & Mesoporous Materials. 2013.
19. C.-H. Yeh, B. Schmitt, D. Le Bihan, J.-R. Li, C.-P. Lin, C. Poupon. *Diffusion Microscopist Simulator: A General Monte Carlo Simulation System for Diffusion Magnetic Resonance Imaging*. PLOS ONE. 2013.
20. J.-R. Li. *A fast time stepping method for evaluating fractional integrals*. SIAM Journal on Scientific Computing. 2010.

21. H. Haddar, J.-R. Li, D. Matignon. *Efficient solution of a wave equation with fractional-order dissipative terms*, Journal of Computational and Applied Mathematics. 2010.
22. J.-R. Li, L. Greengard. *High Order Accurate Methods for the Evaluation of Layer Heat Potentials*, SIAM Journal on Scientific Computing. 2009.
23. J.-R. Li, D. Calhoun, L. Brush. *Efficient thermal field computation in phase field models*. Journal of Computational Physics. 2009.
24. P. Benner, J.-R. Li, T. Penzl. *Numerical solution of large-scale Lyapunov equations, Riccati equations, and linear-quadratic optimal control problems*. Numerical Linear Algebra with Applications. 2008.
25. J.-R. Li, L. Greengard. *On the numerical solution of the heat equation I: fast solvers in free space*. Journal of Computational Physics. 2007.
26. P. Joly, J.-R. Li, S. Fliss. *Exact boundary conditions for periodic waveguides containing a local perturbation*. Communications in Computational Physics. 2006.
27. J. Li. *Low order approximation of the spherical nonreflecting boundary kernel for the wave equation*. Linear Algebra and its Applications. 2006.
28. S. Gugercin, J.-R. Li. *Smith-Type methods for balanced truncation of large sparse systems, Dimension Reduction of Large-Scale Systems*. Proceedings of a Workshop held in Oberwolfach, Germany. Series: Lecture Notes in Computational Science and Engineering. 2005.
29. J.-R. Li, J. White. *Low rank solution of Lyapunov equations*. SIAM Review, SIGEST selection. 2004.
30. J.-R. Li, L. Greengard. *High order marching schemes for the wave equation in complex geometry*. Journal of Computational Physics. 2004.
31. J.-R. Li, L. Greengard. *Strongly consistent marching schemes for the wave equation*. Journal of Computational Physics. 2003.
32. J.-R. Li, J. White. *Low rank solution of Lyapunov equations*. SIAM Journal on Matrix Analysis and Applications. 2002.
33. J.-R. Li, J. White. *Reduction of large circuit models via low rank approximate Gramian*. International Journal of Applied Mathematics and Computer Science. 2001.
34. J.-R. Li, J. White. *Efficient Model Reduction of Interconnect via Approximate System Grammians*. IEEE/ACM International Conference on Computer-Aided Design. Digest of Technical Papers. 1999.
35. J.-R. Li, F. Wang, J. White. *An Efficient Lyapunov Equation-Based Approach for Generating Reduced Order Models of Interconnect*. Design Automation Conference. Proceedings. 1999.
36. J.-R. Li, J. White. *Improving the efficiency of multipole-accelerated method-of-moments solvers using dual grid multipole expansions*. IEEE 6th Topical Meeting on Electrical Performance of Electronic Packaging. Proceedings. 1997.