

## Curriculum vitae

### Personal data

Jing-Rebecca Li

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### Education

December 2013, HDR (Habilitation à Diriger des Recherches)

Université Paris-Sud, Orsay, France

Topic : Modelisation et simulation de la diffusion

September 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).

May 1995, Bachelor of Science in Honors Mathematics

University of Michigan, Ann Arbor, MI, USA

With Highest Distinction

### Training

October 2017-September 2018, Formation à la thérapie interpersonnelle basée sur l'attachement

Association Française de Thérapie Interpersonnelle, Paris, France

### Employment

November 2003– present, Research Scientist

Institut National de Recherche en Informatique et en Automatique (INRIA)

INRIA-Saclay, France

September 2000 – September 2003, Post-Doctoral Researcher

Courant Institute of Mathematical Sciences, New York, NY, USA

### Research Experience

July 2010 – present, member of Equipe DEFI, INRIA-Saclay, France

Oct 2008 – present, external collaborator at Neurospin, Saclay, France

Modeling and simulation of diffusion MRI in biological tissue

November 2003 – June 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.

September 2000 – September 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.

September 1996 – August 2000, Research Lab. of Electronics, MIT, Massachusetts, USA

Numerical linear algebra

Reduced models for on-chip interconnect modeling

## Teaching

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

## Graduate level supervision

- Ph.D. of Jingjing Hao (Oct 2017 – present). Topic: *Using EEG in the diagnosis and evaluation in adult AD/HD*. Co-advisor: Hassan Rahioui.
- Ph.D. of Khieu Van Nguyen (Feb 2014 – April 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 (Sept 2013 – Dec 2016). Topic: *Homogenized models for diffusion MRI*. Co-advisor: Housseem Haddar.
- Ph.D. of Gabrielle Fournet (Nov 2013 – Nov 2016). Topic: *Computational imaging of the aging cerebral microvasculature*. Co-advisor: Luisa Ciobanu.
- Ph.D. of Hang Tuan Nguyen (Oct 2010 – Jan 2014). Topic: *Tissue parameters estimation for dMRI signals in biological tissue*. Co-advisors: Cyril Poupon and Denis Grebenkov.
- Ph.D. of Dang Van Nguyen (Oct 2010 – Jan 2014). Topic: *Efficient finite elements code for the simulation of dMRI signals in complex geometry*. Co-advisor: Denis Grebenkov.
  
- Post-doc of Imen Mekkaoui (Nov 2017 – present). Topic: *In-vivo cardiac diffusion magnetic resonance imaging: simulations and parameters estimation*. Co-supervisor: Jan Hesthaven.
- Post-doc of Julien Coatleven (Mar 2012-Aug 2012). Topic: *Asymptotic models for multiple compartments diffusion using mathematical homogenization*. Co-supervisor: Housseem Haddar.
- Post-doc of Fabien Caubet (Jan 2013-Aug 2013). Topic: *New transmission condition accounting for diffusion anisotropy in thin layers applied to diffusion MRI*. Co-supervisor: Housseem Haddar.
- Post-PhD study of Imen Mekkaoui (Feb 2017 – June 2017). Topic: *Quantification of cardiac motion and strain effects on the diffusion MRI signal*. Collaborators: Jan Hesthaven (EPFL), Jerome Pousin (Université de Lyon, INSA de Lyon).
  
- 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

- Member of the SIAM Committee on Programs and Conferences, 2017-present.
- 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 - *Novel ideas for radically new technologies*, 2015.
- Associate editor of Society for Industrial and Applied Mathematics (SIAM) Journal on Scientific Computing, 2010-2015.
- Editor of special issue of Journal of Computational and Applied Mathematics for the International Conference on Mathematical and Numerical Aspects of Waves (WAVES), 2007.

## Organization

- Organizer of the Summer School for Chinese students in mathematics and computer science (*Ecole d'Été France Excellence*), financed by the French Embassy in China, Palaiseau, France, 2017.
- Member of Organizing Committee of *SIAM Conference on Computational Science and Engineering*, 2017.
- Member of Scientific Committee of Conference *Analysis, probability, from theory to industrial applications: ten years of the french-vietnamese master in applied mathematics*, 2016.
- Organizer of mini-symposium *New Developments in time-stepping strategies for diffusive-type differential equations*, SIAM Conference on Computational Science and Engineering, 2017
- 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.

## Prizes and Awards

- Article Low rank solution of Lyapunov equations chosen as a SIGEST selection in SIAM Review, 2004, 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.
- Leslie Fox Prize in Numerical Analysis, Second Prize, 2001.
- 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. *Stimulated echo vs spin echo IVIM acquisitions and their influence on the metrics of the bi-exponential model*. Submitted.
2. H. Haddar, J.-R. Li, S. Schiavi. *Understanding the time-dependent diffusion tensor measured by diffusion MRI: the intra-cellular case*. Submitted.
3. P. Svehla, K. V. Nguyen, J.-R. Li, L. Ciobanu. *Quantitative DLA-based compressed sensing for T1-weighted acquisitions*. Journal of Magnetic Resonance. 2017.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.

10. 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.
11. J.-R. Li, H. T. Nguyen, D. V. Nguyen, H. Haddar, J. Coatléven, D. Le Bihan. *Numerical study of a macroscopic finite pulse model of the diffusion MRI signal*, Journal of Magnetic Resonance. 2014.
12. 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.
13. 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.
14. J. Coatleven, H. Haddar, J.-R. Li. *A new macroscopic model including membrane exchange for diffusion MRI*, SIAM Journal of Applied Mathematics. 2014.
15. 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.
16. 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.
17. 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.
18. 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.
19. J.-R. Li. *A fast time stepping method for evaluating fractional integrals*. SIAM Journal on Scientific Computing. 2010.
20. 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.
21. J.-R. Li, L. Greengard. *High Order Accurate Methods for the Evaluation of Layer Heat Potentials*, SIAM Journal on Scientific Computing. 2009.
22. J.-R. Li, D. Calhoun, L. Brush. *Efficient thermal field computation in phase field models*. Journal of Computational Physics. 2009.
23. 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.
24. J.-R. Li, L. Greengard. *On the numerical solution of the heat equation I: fast solvers in free space*. Journal of Computational Physics. 2007.
25. P. Joly, J.-R. Li, S. Fliss. *Exact boundary conditions for periodic waveguides containing a local perturbation*. Communications in Computational Physics. 2006.
26. J. Li. *Low order approximation of the spherical nonreflecting boundary kernel for the wave equation*. Linear Algebra and its Applications. 2006.

27. 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.
28. J.-R. Li, J. White. *Low rank solution of Lyapunov equations*. SIAM Review, SIGEST selection. 2004.
29. J.-R. Li, L. Greengard. *High order marching schemes for the wave equation in complex geometry*. Journal of Computational Physics. 2004.
30. J.-R. Li, L. Greengard. *Strongly consistent marching schemes for the wave equation*. Journal of Computational Physics. 2003.
31. J.-R. Li, J. White. *Low rank solution of Lyapunov equations*. SIAM Journal on Matrix Analysis and Applications. 2002.
32. J.-R. Li, J. White. *Reduction of large circuit models via low rank approximate Gramian*. International Journal of Applied Mathematics and Computer Science. 2001.
33. 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.
34. 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.
35. 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.