

Robert M. Gower

Curriculum Vitae

CONTACT INFORMATION	<i>Mobile:</i> +44(0)745 099 6926 <i>E-mail:</i> gowerrobert@gmail.com <i>Website:</i> perso.telecom-paristech.fr/rgower/
NATIONALITY	British and Brazilian
INTERESTS	Optimization, machine learning, randomized and stochastic algorithms
EMPLOYMENT & EDUCATION	Assistant Professor in Machine Learning 09/2017 – Télécom-Paristech, within the LCTI laboratory, Paris, France Post-doctoral Laureate 08/2016 – 09/2017 École Normale Supérieure and INRIA, Funded by FSMP grant Ph.D. in Mathematics 09/2012 – 06/2016 The University of Edinburgh, UK <i>Sketch-and-project methods in optimization and numerical linear algebra</i> Market Model Analyst, Itaú-Unibanco São Paulo, Brazil. 05/2011 – 07/2012 M.Sc. in Applied Mathematics, University of Campinas, SP 03/2009 – 05/2011 B.Sc. in Applied Mathematics, University of Campinas, SP 03/2005 – 12/2008
PAPERS	R.M. Gower, Nicolas Le Roux and Francis Bach Tracking the gradients using the Hessian: A new look at variance reducing stochastic methods, <i>arXiv:1710.07462</i> , 2017 R.M. Gower and P. Richtárik Linearly Convergent Randomized Iterative Methods for Computing the Pseudoinverse, <i>arXiv:1612.06255</i> , 2016 R.M. Gower, Donald Goldfarb and P. Richtárik Stochastic Block BFGS: Squeezing More Curvature out of Data In <i>Proceedings of the 33rd International Conference on Machine Learning</i> , 2016 R.M. Gower and P. Richtárik Randomized quasi-Newton updates are linearly convergent matrix inversion algorithms, to appear in <i>SIAM Journal on Matrix Analysis and its applications</i> , 2016 R.M. Gower and P. Richtárik Stochastic dual ascent for solving linear systems <i>arXiv:1437459</i> , 2015 R.M. Gower and P. Richtárik Randomized iterative methods for linear systems

SIAM Journal on Matrix Analysis and its applications 36(4), 1660-1690, 2015
Most Downloaded Paper from the SIMAX website (May 2017)

R.M. Gower and A.L. Gower

High order reverse automatic differentiation with emphasis on the third order
Mathematical Programming Series A 155(1), 81-103, 2014

R.M. Gower and Jacek Gondzio

Action constrained quasi-Newton methods
ERGO 14-020, 2014

R.M. Gower, *et. al.*

Chapter: Drawing a track map
In: **Train Positioning Using Video Odometry**
The MIIS Eprints Archive, 2014

R.M. Gower and M.P. Mello

Computing the sparsity pattern of Hessians using automatic differentiation
ACM Transactions on Mathematical Software, 40(2), 2014

R.M. Gower and M.P. Mello

A new framework for Hessian automatic differentiation
Optimization Methods and Software, 27(2), 2012

PRIZES

2017 **2nd place** in the bi-annual Leslie Fox best paper in numerical analysis award

2014 **Best talk prize** at the Irish SIAM student meeting

Teaching Awards nominated for the 2014 Edinburgh University Students' Association Teaching Awards by student vote.

TALKS

2017 Programme Gaspard Monge days, EDF'Lab Paris-Saclay, November 13-14.

France / Japan Machine Learning Workshop , Inria Grenoble Rhone-Alpes, March 21.

Optimization, machine learning, and pluri-disciplinarity workshop, Paris, École Normale Supérieure, September 21-22.

Probabilistic Numerics seminar, Max-Planck-Institute Tubingen, January 25-27.

Operations Research seminar, Center for Operations Research and Econometrics, Université catholique de Louvain, December 13, 2016

2016 Computational Mathematics and Applications seminar, Rutherford Appleton Laboratory, November 24, 2016

Télécom ParisTech, Machine Learning and Statistics seminar, Paris, November 10

International Conference on Continuous Optimization, Tokyo, August 6-11

5th IMA Conference on Numerical Linear Algebra and Optimization, University of Birmingham, September 7-9

International Conference on Machine Learning (**ICML**), poster and talk, New York, June 19-23

Cambridge Image Analysis group seminar, University of Cambridge
Randomized iterative methods for linear systems

INRIA Rocquencourt, SIERRA team seminar, Paris
Randomized iterative methods for linear systems and inverting matrices

2015 Distributed machine learning and optimization,
Alan Turing Scoping Workshop, Edinburgh, UK
Distributed Randomized Iterative Methods for Linear Systems

The International Symposium on Mathematical Programming, Pittsburgh, USA.
Action constrained quasi-Newton methods

Optimization and Big Data 2015, Edinburgh, UK
Randomized iterative methods for linear systems and inverting matrices

2014 Irish Applied Mathematics Research Students' Meeting, Galway, Ireland.
Hunting inverses of matrix fields
[Best Talk Prize]

Postgraduate Mathematics Colloquium, Edinburgh, UK
The history of optimization in blood and booze

Cambridge Mathematics Society Research in the UK Afternoon, Cambridge, UK
Unconstrained optimization methods

European Workshop on Advances in Continuous Optimization, Perpignan.
Generalizations of the quasi-Newton methods using an image constraint

2013 International Conference on Continuous Optimization, Lisbon, Portugal
Third order methods and third order derivatives

EURO-INFORMS Joint International Meeting, Rome, Italy
Third order methods using slices of the tensor and AD developments

2011 28th Brazilian Colloquium on Mathematics, IMPA, Rio de Janeiro, Brasil
Automatic differentiation of Hessian matrices

POSTER
SESSIONS 2015 Data Science Research Day, Edinburgh, UK
Randomized methods for inverting matrices

2014 Computational Linear Algebra and Optimization for the Digital Economy, Edinburgh
Automatic high order tensor derivatives

2011 Brazilian Society on Applied and Computational Mathematics
Águas de Lindóia, Brasil
A new automatic differentiation mode for sparse Hessian matrices

TEACHING 2017 Lectured a 5 hour course on Stochastic Optimization for Machine Learning at the
Spring School on Optimization and Data Science, University of Novi Sad, Serbia.

2014 – 2015 Lectured M.Sc. Revision course
Created exams, worksheets and lectured a 12 hours revision course for newly admitted M.Sc.
students in Operations Research.

- 2013 – 2014 Junior Teaching Fellow
Appointed to organize workshops in linear algebra and calculus, tailored through requests made by students through an online system
- 2013 Special needs tutorials
Tutored a course in proofs and problem solving for a group of students with Asperger’s Syndrome and Autism spectrum disorders.
- 2012 – 2015 Teaching Assistant
With a teaching scholarship, I tutored undergraduate courses in linear algebra, calculus, proofs and problem solving, and graduate course in fundamentals of optimization, fundamentals of operations research, optimization methods in finance and computing for operational research.
- 2010 – 2011 Teaching Assistant/ Lecturer
Financial Mathematics and Combinatorial Programming - State University of Campinas, Brazil.
- 2010 – 2011 Continued education for state school teachers
Tutored probability for the continued education of state school mathematics teachers of São Paulo.
- FUNDING 2016 **€122k** The Fondation Sciences Mathématiques de Paris Post-doctoral program
- 2015 **£800** Laura Wisewell Travel Scholarships, EUROPT Florence and EURO Rome
- 2013 **£800** Laura Wisewell Travel Scholarships, ISMP Pittsburgh
- 2012 **£85,1k** Ph.D. scholarship, University of Edinburgh, School of Mathematics
€84k Ph.D. scholarship, Hardiman Foundation
National University of Ireland - Application No: 075
I declined this Ph.D. funding in favour of the funded Ph.D in the University of Edinburgh
£55,1k Ph.D. scholarship, Brazilian National Council for Scientific and Technological Development, CNPq - 200440/2012-8
I declined this Ph.D. in favour of the funded Ph.D. in the University of Edinburgh
- 2009 **R\$29k** M.Sc. scholarship, São Paulo Research Foundation
CNPq - 09/04785-7 *Automatic differentiation of Hessian matrices*
- 2007 **R\$6k** Undergraduate research scholarship, São Paulo Research Foundation
Efficient calculation of derivatives through graph colouring
- OUTREACH 2013 Maths and Magic
During the 2013 Edinburgh Innovative Learning week, I helped run a workshop on elusive magic tricks based on mathematics
- 2013 Secondary school advanced highers revision
Tutored local secondary school students preparing for a university entry examination in mathematics (Scottish Advanced Highers)
- ACADEMIC SERVICES Reviewer for
Taylor & Francis, Optimization Methods and Software
Springer, Computational and Applied Mathematics
Springer, Mathematical Programming Computation
Springer BIT Numerical Mathematics
Springer, Numerical Algorithms