Gonçalo dos Reis — *Curriculum Vitae*

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Personal data

- Institutional address:
  University of Edinburgh - School of Mathematics
  Peter Guthrie Tait Road, EH9 3FD, Edinburgh, UK
- Portuguese nationality.
- Languages: Portuguese, English, German, French.

Interests

- Stochastic Analysis, Mathematical Finance, Statistics, Probabilistic numerical methods: applications in Finance & Physics, Financial Risk

Employment

- *Lecturer* at university of Edinburgh, 2014 -
- *Postdoctoral fellow* with Prof. P. Friz at Technische Uni. Berlin, 2010-2014
- *Postdoctoral fellow* with Prof. N. Touzi at École Polytechnique - CMAP, 2009-10
- *Associated researcher* with Prof. P. Imkeller at Humboldt Uni. zu Berlin, 2008-09

Education

- *Ph.D. in Mathematics*, Humboldt University of Berlin, 2012. *On some properties of solutions of quadratic growth BSDE and applications in finance and insurance*, Advisor: P. Imkeller,
- *Diploma in Mathematics with Major in Numerical analysis* at Instituto Superior Técnico, Lisbon 2004. Thesis: *Numerical Methods for Stochastic Differential Equations*, Advisor: Prof. A. B. Cruzeiro
- *Postgraduate Certificate Academic Practice (PgCAP)* at U. of Edinburgh,
  To graduate Nov/2017/27
- *Fellow of the Higher Education Academy (HEA, UK)*, Certificate in recognition of attainment against the UK Professional Standards Framework for teaching and learning support in higher education (PgCAP)
  Date of Recognition: Automatic recognition after graduation from PgCAP.

Funding

Current

- [Decision expected Nov/2017] Royal Society *International Exchange Grant* (IES\R2\170009).
  Role: Lead Applicant

Past

- EPSRC Impact Acceleration - 2015/Set - 2017/Mar: *New algorithms for Efficient risk estimation*. Partner: *Nomura Bank plc*
  Role: PI
  Grant: £25.000 by EPSRC Impact Acceleration Account
  Impact: the project has led to an *impact* case
- EPSRC Impact Acceleration - 2015/Jan - Sep : *Hybrid Risk Models - Numerical Algorithms for Efficient Calibration*. Partner: *Moody's Analytics*
  Role: PI
  Grant: £30.000 by EPSRC Impact Acceleration Account
- IKYDA Proj # 54718970 - 2012-13 : *Stochastic analysis in finance and physics*
  Role: Associated researcher
  Grant: €25.000 by German Academic Exchange Service (DAAD)
- SANAF - Stochastic Ana. and numerical approx. in finance (and physics) - 2009-12

Role: task leader (jointly)
Task: Parallel algorithms for FBSDE and app. to reaction-diffusion equations
Grant: €210.000+$15.000 by Portuguese Sci. Foundation and Uni. of Texas

- DFG Research Center Matheon - Project E2: *Hedging of external risk factors*
  Role: Associated researcher
- 5 month AMaMeF exchange grant (€10000)

For Events

- *International Workshop on BSDEs, SPDEs and their applications*, 2017, Edinburgh (UK), 03-07 Jul, 2017 Grant: £35.000 by ICMS, LMS, UoE, HW, GMJT, Heilbronn.
- *MCMC and particle methods: sampling, inference and stochastic approximation*, Edinburgh (UK), Sep. 2016 Grant: £12.000 by ICMS
- *Mini-course in Pathwise integration and particle methods*, Edinburgh (Scotland), 18 to 21 April 2016 Grant: £4.000 by MIGSAA, IMA, UoE, HW
- *New Trends in Computational Finance and Related Topics*, Edinburgh (Scotland), 24-25 Apr, 2014, Grant: £15.000 by NAIS

Awards & Grants

- Full PhD Scholarship (4 years)- Portuguese Foundation for Science and Technology
- Undergraduate excellency prize, *New talents in mathematics* by the Calouste Gulbenkian Foundation (PT) 2000/01.

Publications Total: 13(+3) - Peer review journals (13); Books (1+2); In collection (1); Preprint (3)

Preprints

3. *Freidlin-Wentzell LDPs in path space for McKean-Vlasov equations and the Functional Iterated Logarithm Law*, with W. Salkeld and J. Tugaut,
   (Submitted - arXiv:1708.04961)
2. *Full-Projection explicit FBSDE scheme for parabolic PDEs with superlinear nonlinearities*, with L. Szpruch and A. Lionet,
   (Submitted - arXiv:1612.00078)
1. *Convergence and qualitative properties of modified explicit schemes for BSDEs with polynomial growth*, with L. Szpruch and A. Lionet,
   (Submitted - arXiv:1607.06733)

Refereed

13. *Robust and Consistent Estimation of Generators in Credit Risk*, with G. Smith,
    To appear in Quantitative Finance, arXiv:1702.08867
12. *Equilibrium pricing under relative performance concerns*, with J. Bielagk and A. Lionet
    SIAM Journal of Financial Mathematics, 2017, Vol. 8, No. 1, Pages 435-482
11. *Hybrid PDE solver for data-driven problems and modern Branching*, with F. Bernal and G. Smith.
    European Journal of Applied Mathematics, 2017, Pages 1-24
10. *Root's barrier and viscosity solutions of obstacle problems*, with P. Gassiat and H. Oberhauser

Stochastic Processes and their Applications, 2015, Vol. 125, No. 12, Pages 4601-4631

9. *Time discretization of FBSDE with polynomial growth drivers and reaction-diffusion PDEs*, with L. Szpruch and A. Lionet,
Annals of Applied Probability, 2015, Vol.15, No.5, Pages 2563-2625

8. *A note on comonotonicity and positivity of the control components of quad. FBSDE*, with R. J. N. dos Reis
Stochastics and Dynamics 2013, Vol. 13, No. 4

7. *Quadratic FBSDE with generalized Burger's type nonlinearities, PDE perturbation and large deviations*, with C. Frei
Stochastics and Dynamics 2013, Vol. 13, No. 2

6. *FBSDE with time delayed generators - Lp-solutions, differentiability, representation formulas and path regularity*, with A. Reveillac and J. Zhang
Stochastic processes and their applications, 2011, Vol. 121, No. 9, pages 2114–2150

5. *A Financial market with interacting investors: does an equilibrium exist?*, with C. Frei
Mathematics and Financial Economics, 2011, Vol. 4, No. 3, Pages 161 - 182

4. *Pricing and hedging of derivatives based on non-tradable underlyings*, with S. Ankirchner and P. Imkeller
Mathematical Finance, 2010, Vol. 20, No. 2, Pages 289 - 312

3. *On Securitization, Market Completion and Equilibrium Risk Transfer*, with U. Horst and T. Pirvu
Mathematics and Financial Economics, 2010, Vol. 2, No. 4, Pages: 211-252

2. *Path regularity and explicit conv. rate for BSDE with truncated quadratic growth*, with P. Imkeller
Stochastic processes and their applications, 2010, Vol. 120, No. 3, Pages: 348-379

1. *Classical and Variational Differentiability of BSDEs with Quadratic Growth*, with S. Ankirchner and P. Imkeller
Electron. J. Probab. 12 (2007), No. 53, 1418–1453 (electronic)

In collection

1. *Results on numerics for BSDE with drivers of quadratic growth*, with P. Imkeller and J. Zhang
In: Contemporary Quantitative Finance (Essays in Honour of Eckhard Platen), Springer, 2010

Books

3. [Forthcoming] *International Society of Bayesian Analysis: ISBA 2018 World Meeting*,
expected 2019

2. [Forthcoming] *Proceedings of the "International Workshop on BSDEs, SPDEs and their Applications"*,
Springer, expected 2018

1. *Some recent advances in quadratic BSDE*,
LAP LAMBERT Academic Publishing, 2011, ISBN-13: 978-3-8443-3307-7

Supervision

PhD

- Greig Smith (3rd year)
  New techniques for Financial Risk with applications to Credit Risk management
- William Salkeld (2nd year)
  Rough paths, Pathwise integration and Large Deviations in path space

Services to the community

Administrative

- *Hiring committee* for Lecturer in Probability at U. of Edinburgh
- *Hiring committee* for PDRA in Probability at U. of Edinburgh
- *Hiring committee* for Junior professorship at Technical University Berlin
- Course conceptualization: "Statistics for Informatics" at TU-Berlin
- Course conceptualization: "· Backward Stochastic differential equations and Applications" at TU-Berlin

Event Organiz.

- Conference: *International Society of Bayesian Analysis: ISBA 2018 World Meeting*, Edinburgh (UK), Jun. 2018 - Task: Organizing committee; ~ 800 participants
- Workshop: *International Workshop on BSDEs, SPDEs and their applications*, Edinburgh (UK), Jul. 2017 - Task: Organizing committee; ~ 200 participants
- Workshop: *MCMC and particle methods: sampling, inference and stochastic approximation*, Edinburgh (UK), Sep. 2016 - Task: Organizing committee; ~50 participants
- Workshop: *New advances in Backward SDEs for financial engineering applications*, Tunisia, Oct. 2010 - Task: Organizing committee; ~80 participants

Referee (short)

- [Journals] Mathematical Finance, Bernoulli, Electronic Journal of Probability (EJP), SIAM Journal of Financial Mathematics, Annals of Applied Probability, Statistics & Probability Letters, Stochastic Processes and their Applications (SPA)
- [Grants] EPSRC, German Research Foundation (DFG), Dutch Research Council (Netherlands Organisation for Scientific Research)

Research

Groups

- Centro de Matemática e Aplicações - CMA/FCT/UNL (Portugal)
  Role: Member of the *Statistics and Risk Management Section*
- Chair Financial Risks of the Risk Foundation, Paris (Past).
- DFG Research Center Matheon, Berlin (Past)

Short visits

- Feb.2018 at University of Columbia (USA) with Dr. L. Lacker
- Feb.2018 at University of Austin Texas (USA) with Dr. T. Zariphopoulou
- Oct.2017 at the Humboldt University in Berlin (Germany) with Dr. P. Imkeller
- Oct.2013 at Ecole Polytechnique (France) with Dr. E. Gobet
- Dec.2012 at the Pireaus University in Pireaus (Greece) with Dr. N. Englezos
- Dec.2012 at Man Institute in Oxford (UK) with Dr. G. Liang

- Mar.2010 at the Humboldt University in Berlin (Germany) with Dr. P. Imkeller
- Mar.2007 at the University of British Columbia (Canada) with Dr. U. Horst

Invited talks

- LMS – EPSRC Durham Symposium on Stochastic analysis, Durham (UK), Jul 2017
- Topics in SDEs and their link to (S)PDEs, Leeds (UK), Sep 2016
- Crossroads: Workshop on Stoch. Analysis and Related Fields, Berlin (DE), July 2016
- Stochastic analysis, controlled dynamical systems and applications, Jena (DE), Mar 2015 zitem International Conference on Advances in Interdisciplinary Statistics and Combinatorics, Greensboro (USA), Oct 2014
- 7th international symposium on Backward Stochastic differential equations, Ji'Nan and Weihai (China), June 2014
- 11th Monte-Carlo Conference (MCQMC2014), Belgium, Apr. 2014
- Workshop on Stochastics and Applications, Finland, Dec 2013
- UT-Austin Portugal Workshop in Mathematics, Portugal, Jul. 2012
- Workshop on topics in stochastic control, Italy, Jul. 2011
- 24th Biennial Conference on Numerical Analysis, UK, 28 Jun. 2011

Selected talks

- 2nd International Conference on Computational Finance 2017 - ICCF2017, Lisbon (PT), Sep 2017
- Stochastic analysis of dynamical systems, stochastic control and games, Leeds (UK), Oct 2016
- At the Frontiers of Quantitative Finance, Edinburgh (UK), June 2016
- 2nd IMA Conference on Mathematics in Finance, Manchester (UK), June 2015
- Maxwell Colloquium: Stochastic Particle Methods, Edinburgh (UK), Feb 2015
- Maxwell Institute Probability Day, December 2014, Edinburgh (UK), Dec 2014
- 2nd young researchers meeting on BSDEs and Finance, Bordeaux (FR), July
- 11th German Probability and Statistics Days, Ulm (Germany), April 2013
- 18th OMG Congress and Annual DMV Meeting, Austria, Sep. 2013
- Joint International Meeting of the AMS and the Romanian Mathematical Society, Romania, Jun. 2013
- Frontiers in Financial Mathematics, Ireland, Jun. 2013
- 6th World congress of the Bachelier society, Canada, Jun 2010
- 9th German Open Conference in Prob. and Statistics, Germany, Mar. 2010
- Stochastic Processes and Applications (SPA) 2009, Germany, 27-31 July 2009
- 4th General Conf. on Advances Math. Methods in Finance, Norway, May 2009
- 3rd Conference on Numerical Methods in Finance, France, Apr. 2009
- Bachelier Finance Society: 5th World Congress, England, Jul. 2008
- 8th German Open Conference in Prob. and Statistics, Germany, Mar. 2008
- 56th session of the International Statistical Institute, Portugal, Aug. 2007

Teaching

Courses

- At *Scottish Mathematical Sciences Training Centre* as Lecturer
  - A Fourier Based Approach of (stochastic) Integration and applications, [PhD level], S1 2017-18
- At *University of Edinburgh* as Lecturer
  - Financial Mathematics, [Y3, UG level], S1 2017-18
  - Stochastic Control and Dynamic Asset Allocation[MSc level], S2 2016-17
  - Financial Mathematics, [Y3, UG level], S1 2016-17
  - Stochastic Control and Dynamic Asset Allocation (2015-16)
  - Financial Mathematics, [Y3, UG level], S1 2015-16
  - Financial Mathematics and Investment, [MSc level], S1 2015-16
  - Financial Mathematics, [Y3, UG level], S1 2014-15
  - Financial Mathematics and Investment, [MSc level], S1 2014-15
- At *Berlin Mathematical School (BMS)* Advanced Courses
  - Financial Mathematics II, [MSc level], Spring 2013 (Teaching assistant)
  - Backward Stochastic differential equations and Applications, [MSc & PhD level],Winter 2012/13 (Teacher)
- At *Technical University Berlin* (Teacher)
  - Stochastic Models, [~45 students, MSc level], Winter 2013/14
  - Mathematics II for Economists, [~200 students], Spring 2011, 2012 and 2013
  - Mathematics I for Economists, [~200 students], Winter 2011/12
- At *École Polytechnique* (Teaching assistant)
  - Numerical Methods for Stochastic Differential Equations, Feb.-Mar. 2009
- At at *Instituto Superior Técnico* (Teaching assistant)
  - Mathematical Analysis II, Fall 2002/03 and 2003/04
  - Mathematical Analysis I, Spring 2003
  - Mathematical Analysis III, Spring 2002

Supervision

PhD

- Greig Smith (3rd year) & William Salkeld (2nd year)

R. Assist.

- 6 Month Research assistant on Industrial project with partner *Moody's Analytics Hybrid Risk Models - Numerical Algorithms for Efficient Calibration*

MSc

- 4-7 dissertation per year since 2014 for UG and PGT programmes at University of Edinburgh. MSc Programmes: *MSc Financial Modelling and Optimization* & *MSc Computational Mathematical Finance*

Selected Supervised dissertation titles:

· Credit Stress Testing
· Value-at-Risk Calculation using Copulas
· Hidden Markov Models for Credit Rating Transitions and applications in Credit Risk
· Hamiltonian Monte Carlo
· MCMC Methods with Applications to Credit Risk
· MCMC methods and estimation of portfolio losses