# > Personal Details


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| Name: | Dr Alexandros Beskos |
| Address: | Department of Statistical Science,<br>University College London,<br>1-19 Torrington Place, London, WC1E 7HB |
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## Appointments

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|---|---|
| 2015: | Reader in Statistics<br>Department of Statistical Science<br>University College of London (UCL) |
| 2014 – 2015: | Leave,<br>Department of Statistics and Applied Probability,<br>National University of Singapore |
| 2013 – 2015: | Senior Lecturer in Statistics<br>Department of Statistical Science, UCL |
| 2008 – 2012: | Lecturer in Statistics<br>Department of Statistical Science, UCL |
| 2007: | Research Fellow<br>Centre for Research in Statistical Methodology (CRISM)<br>Department of Statistics, University of Warwick |
| 2005 – 2006: | Research Fellow, under EPSRC grant<br>Mathematics Institute, University of Warwick<br>Title of Grant: Langevin Algorithms: Questions at the Numerical Analysis/Applied Probability interface |

## Education

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| 2002 – 2006: | PhD in Statistics<br>Title: *Exact Simulation of Diffusions and new Inference Methods for Discrete Time Data; also included, the One-Shot CFTP Algorithm*<br>Department of Mathematics and Statistics, Lancaster University, UK<br>Supervisor: Professor Gareth Roberts |
| 1996 – 2000: | B.Sc. in Statistics (mark, 9.3/10)<br>Department of Statistics<br>Athens University of Economics and Business, Greece |

# > Research

## Main Research Interests

Sequential Monte-Carlo; Markov Chain Monte-Carlo; Bayesian Statistics; Computational Statistics; Monte-Carlo algorithms in High Dimensions; Inverse Problems; Inference, Applications and Simulation for SDEs; Fractional and White Noise in Econometrics; Hidden Markov Models; Biostatistics.

## Scientific Collaborators

- Professor Dan Crisan, Imperial College, UK
- Dr Maria De Iorio, University College London, UK
- Dr Joseph Dureau, Snips, Paris, France
- Professor Simon Godsill, Cambridge, UK
- Dr Ajay Jasra, National University of Singapore, Singapore
- Dr Kari Heine, UCL, UK
- Dr Kostas Kalogeropoulos, London School of Economics, UK
- Dr Kengo Kamatani, Osaka University, Japan
- Dr Nikolaos Kantas, Imperial College, UK
- Dr Kody Law, Oak Ridge National Laboratory, USA
- Dr Omiros Papaspiliopoulos, Universitat Pompeu Fabra, Spain
- Dr Stefano Peluchetti, HBSC, London, UK
- Dr Adam Persing, Mezocliq, New York, USA
- Dr Natesh Pillai, Harvard University, USA
- Professor Gareth Roberts, University of Warwick, UK
- Professor Jesus Sanz Serna, Universidad de Valladolid, Spain
- Dr Sumeetpal Singh, Cambridge, UK
- Professor Andrew Stuart, University of Warwick, UK
- Dr Alex Thiery, National University of Singapore, Singapore
- Dr Jochen Voss, University of Leeds, UK

## PhD Students

2008-13: Zhen Li (2nd supervisor), UCL
2009-14: Erik Pazos (1st supervisor), UCL
2012-15: Sam Livingstone (co-supervisor, with Prof Mark Girolami), UCL
2013-16: Tjun Yee Hoh (2nd supervisor), UCL
2015- : Neil Foster (1st supervisor), UCL

## Post-Docs

2014-16: Kari Heine, UCL
2013-14: Adam Persing, UCL
2012-13: Nikolaos Kantas, UCL

# > Research

## Grants/Awards

- Principal Investigator, EPSRC First Grant, one year, 1 post-doc (Jul 2012 - Jun 2013), EP/J01365X/1: Sequential Monte Carlo Methods for Applications in High Dimensions. EPSRC Contribution, 98,868£

- Co-Investigator, EPSRC Standard Grant, three years, 1 post-doc (Oct 2013 - Sep 2016), EP/K01501X/1: Advanced Stochastic Computation for Inference from Tree, Graph and Network Models. EPSRC Contribution, 408,546£

- Principal Investigator, Leverhulme Trust Prize, three years, 1 post-doc (Feb 2015 - Jan 2018), one of 5 prizes awarded in Mathematics & Statistics. Value, 100,000£

## Publications [Google Scholar Citations on 17th Feb 2016]

- **International Journals (refereed)**

1. Beskos, A., Roberts, G., Thiery, A., Pillai, N. (2015)
   *Asymptotic Analysis of the Random-Walk Metropolis Algorithm on Ridged Densities.*
   Submitted to Annals of Applied Probability.

2. Jasra, A., Persing, A., Beskos, A., Heine, K., De Iorio, M. (2015)
   *Bayesian Inference for Duplication-Mutation with Complementarity Network Models.*
   Journal of Computational Biology, 22, 1025-1033.

3. Beskos, A., Jasra, A., Law, K., Tempone, R., Zhou, Y. (2015)
   *Multilevel Sequential Monte-Carlo Samplers. [4]*
   Submitted to Stochastic Processes and Applications.

4. Beskos, A., Crisan, D., Jasra, A., Katamani, K., Zhou, Y. (2015)
   *A Stable Particle Filter in High-Dimensions. [9]*
   Submitted to Journal of Applied Statistics.

5. Beskos, A., Jasra, A., Muzaffer, E., Stuart, A. (2015)
   *Sequential Monte-Carlo Methods for Bayesian Elliptic Inverse Problems. [4]*
   Statistics & Computing, 25, 727-737.

6. Beskos, A., Jasra, A., Kantas, N., Thiery, A. (2015).
   *On the Convergence of Adaptive Sequential Monte Carlo Methods. [12]*
   To appear in the Annals of Applied Probability.

# > Research

7. Dureau, J., Beskos, A., Kalogeropoulos, K. (2015).
   *Bayesian Inference for Partially Observed SDEs Driven by Fractional Brownian Motion. [2]*
   Biometrika.

8. Guo, X., Beskos, A., Siddiqui, A. (2014)
   *The Natural Hedge of a Gas-Fired Power Plant.*
   Computational Management Science.

9. Persing, A., Jasra, A., Beskos, A., De Iorio, M., Balding D. (2015).
   *A simulation approach for change-points on phylogenetic trees.*
   Journal of Computational Biology, 22, 10-24

10. Kantas, N., Beskos, A., Jasra, A. (2014).
    *Sequential Monte Carlo Methods for High-Dimensional Inverse Problems:*
    *A Case Study for the Navier-Stokes Equations. [13]*
    SIAM/ASA Journal of Uncertainty Quantification, 2, 464-489.

11. Beskos, A. (2014).
    *A Stable Manifold MCMC Method for High Dimensions. [5]*
    Statistics and Probability Letters, 90, 46-52.

12. Beskos, A., Crisan, D., Jasra, A., Whiteley N. (2014).
    *Error Bounds and Normalising Constants for SMC Samplers in High Dimensions. [24]*
    Advances in Applied Probability, 46, 279-306.

13. Beskos, A., Crisan, D., Jasra, A. (2014).
    *On the Stability of Sequential Monte-Carlo Methods in High Dimensions. [57]*
    Annals of Applied Probability, 24, 1396-1445.

14. Beskos, A., Kalogeropoulos, K., Pazos, E. (2013).
    *Advanced MCMC Methods for Sampling on Diffusion Pathspace. [12]*
    Stochastic Processes and their Applications, 123, 1415-1453.

15. Sermaidis G., Papaspiliopoulos, O., Roberts, G., Beskos, A., Fearnhead, P. (2013).
    *Markov chain Monte Carlo for Exact Inference for Diffusions. [13]*
    Scandinavian Journal of Statistics, 40, 294-321.

16. Beskos, A., Pillai, N., Roberts, G., Sanz-Serna, J., Stuart, A., (2013).
    *Optimal Tuning of the Hybrid Monte-Carlo Algorithm. [82]*
    Bernoulli, 19, 1501-1534.

17. Beskos, A., Peluchetti, S., Roberts, G. (2012).
    *Epsilon-Strong Simulation of the Brownian Path. [10]*
    Bernoulli, 18, 1223-1248.

# > Research

18. Beskos, A., Pinski, F., Sanz-Serna, J., Stuart, A. (2011).
*Hybrid Monte-Carlo on Hilbert Spaces. [63]*
Stochastic Processes and Applications, 121, 2201-2230.

19. Beskos, A., Roberts, G., Stuart, A. (2009).
*Optimal Scalings for Local M-H Chains on Non-Product targets in High Dimensions. [65]*
Annals of Applied Probability, 19, 863-898.

20. Beskos, A., Papaspiliopoulos, O., Roberts, G. (2009).
*Monte Carlo ML Estimation for Discretely Observed Diffusion Processes. [52]*
Annals of Statistics, 37, 223-245.

21. Beskos, A., Roberts, G., Stuart, A., Voss, J. (2008).
*MCMC Methods for Diffusion Bridges. [96]*
Stochastics and Dynamics, 8, 319-350.

22. Beskos, A., Papaspiliopoulos, O., Roberts, G. (2008).
*A Factorization of Diffusion Measure and Finite Sample Path Constructions. [72]*
Methodology and Computing in Applied Probability, 10, 85-104.

23. Beskos, A., Papaspiliopoulos, O., Roberts, G., Fearnhead, P. (2006).
*Exact and Computationally Efficient Likelihood-Based Estimation for Discretely Observed Diffusion Processes (with discussion and reply from the authors). [276]*
Journal of the Royal Statistical Society, Series B, Statistical Methodology, 68, 1-29.

24. Beskos, A., Papaspiliopoulos, O., Roberts, G. (2006).
*Retrospective Exact Simulation of Diffusion Sample Paths with Applications. [149]*
Bernoulli, 12, 1077-1098.

25. Beskos, A., Roberts, G. (2005).
*One-Shot CFTP; Application to a Class of Truncated Gaussian Densities. [8]*
Methodology and Computing in Applied Probability, 7, 407-437.

26. Beskos, A., Roberts, G. (2005).
*Exact Simulation of Diffusions. [186]*
Annals of Applied Probability, 15, 2422-2444.

- **Conference Proceedings / Book Chapters / Other Written Contributions**

1. Beskos, A., Jasra, A. (2014).
Discussion of published Paper by Gerber & Chopin, JRSSB, 2015.

2. Beskos, A., Stuart, A. (2011).
Discussion of published paper by Girolami & Calderhead, JRSSB, 2011.

# > Research

3. Beskos, A, Pillai, N., Roberts, G., Sanz-Serna, J., Stuart, A. (2010).
   *The acceptance probability of the HMC method in high-dimensional problems. [2]*
   American Institute for Physics, Conference Proceedings, 1281, 23-27.

4. Beskos, A., Stuart, A. (2009).
   *MCMC Methods for Sampling Function Space. [40]*
   Proceedings of the Int. Congress of Industrial and Appl. Mathematicians, (Zurich, 2007).

5. Beskos, A., Stuart, A. (2008).
   *Computational Complexity of Metropolis-Hastings Methods in High Dimensions. [14]*
   Proceedings of the 8th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing (MCQMC 2008), ed. Pierre L'Ecuyer, Art B. Owen.

## Talks – Presentations

- Invited Talk at "4th Institute of Math. Stat. Asia Pacific Rim Meeting", Hong Kong, Jul 16
- Invited Talk at SIAM Conference on Uncertainly Quantification, Lausanne, Apr 16
- Plenary Talk at "Comp. Stat. and Molecular Simulation" workshop, Paris, Feb 16
- Invited Talk at National University of Singapore, Singapore, Dec 15
- Invited Talk at "Intractable Likelihood" Workshop, Warwick, Nov 15
- Invited Talk at "Non-Reversible Markov Chains for MCMC" Workshop, Warwick, Sep 15
- Invited Talk at SciCADE2015, Potsdam, Germany, Sep 15
- Invited Talk at SMC2015, ENSAE, Paris, France, Aug 15
- Contributed talk at EMS2015, European Meeting of Statisticians, Amsterdam, Jul 15
- Contributed Talk at BISP9, Bayesian Inference in Stochastic Processes, Istanbul, Jun 15
- Invited Talk at Athens Probability Colloquium, Athens, Greece, May 15
- Invited Seminar at Dept of Statistics & Applied Probability, Nat Uni of Singapore, Apr 15
- Invited Talk at ERCIM 2014 Comp. & Methodological Statistics, Piza, Italy, Dec 14
- Invited Talk at Department of Mathematics, University of Bath, UK, Dec 14
- Invited Talk at Collegio Carlo Alberto, Turin, Italy, Nov 14
- Invited Talk at MRC Biostatistics Unit, Cambridge, UK, Nov 14
- Contributed Talk at ISBA 2014, Int. Society for Bayesian Analysis, Cancun, Jun 14
- Invited Talk at Computational Methods for Statistical Mechanics, Edinburgh, UK, Jun 14
- Invited Talk at ENSAE, Paris, France, Jun 14
- Invited Talk at Monte-Carlo Inference for Complex Statistical Models, Cambridge, Apr 14
- Invited Talk at KAUST, Jedda, Saudi Arabia, Feb 14
- Invited Talk at Conditional Ergodicity in Space and Time Workshop, Warwick, UK, Jun 13
- Contributed Talk at Bayesian Inference for Stochastic Processes Workshop, Milan, Jun 13
- Invited Seminar at Dept of Statistics, University of Oxford, Nov 12
- Invited Seminar at Dept of Mathematics, Imperial College, London, Nov 12
- Invited Talk at Data Assimilation Workshop, Oxford, Sep 12
- Invited Talk at 8$^{th}$ World Congress in Probability & Statistics, Istanbul, Turkey, Jul 12
- Contributed Talk at ISBA 2012 World Meeting, Kyoto, Japan, Jun 12
- Invited talk at Workshop in Advances in MCMC, Edinburgh, UK, Apr 12

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- Invited Seminar at Gatsbe Institute, UCL, UK, Mar 12
- Invited Seminar at Department of Applied Probability and Stats, NUS, Singapore, Feb 12
- Invited Seminar at Energy Institute, UCL, London, UK, Jan 12
- Invited Talk at 2nd Workshop on Numerical Methods for Solving the Filtering Problem and High Order Methods for solving Parabolic PDEs, Imperial College, London, Sep 11
- Invited talk at Greek Stochastics Gamma, Rethimnon, Crete, Greece, May 11
- Invited Seminar at Dept of Statistics, Harvard University, Boston, USA, Mar 11
- Invited Seminar at CSML (Computing Science & Machine Learning), London, UK, Dec 10
- Invited Seminar at Dept of Mathematics, University of Durham, Durham, UK, Nov 10
- Invited talk at EMS2010, European Meeting of Statisticians, Peiraias, Greece, Aug 10
- Invited Talk at IWAP2010, 5th International Workshop in Applied Prob., Madrid, Jul 10
- Invited Seminar at Dept of Mathematics, Imperial, London, UK, May 10
- Invited Seminar at School of Mathematical Sciences, University College Dublin, Feb 10
- Invited Seminar at Dept of Computing Science, University of Glasgow, Feb 10
- Invited Seminar at Dept of Mathematics, University of Bristol, Nov 09
- Invited Seminar at Young Researchers Meeting, University of Warwick, Oct 09
- Invited Seminar at Dept of Mathematics, University of Cyprus, Oct 09
- Contributed Talk at EMS2009, Eur. Meeting of Statisticians, Toulouse, France, July 09
- Invited Talk at BISP6, Bayesian Inference in Stochastic Processes, Bressanone, Jun 09
- Invited Seminar at Dipartimento di Matematica, Politecnico di Milano, Italy, Apr 09
- Invited Seminar at Institute of Mathematics, University of Kent, Cantenbury, Apr 09
- Invited Talk at EPSRC Symposium Workshop on MCMC, Warwick, Mar 09
- Invited Seminar at Dept of Statistics, London School of Economics, London, Jan 09
- Invited Talk at 7th World Congress in Probability and Statistics, Singapore, July 08
- Invited Seminar at Dept of Economics, Universitat Pompeu Fabra, Barcelona, Mar 08

# > Professional Service

## Enabling Contribution

- Associate Editor at the Bulletin of the Hellenic Mathematical Society (2016-)
- Founding Committee Member of the Applied Probability Section, Royal Statistical Society
- MSc Admissions (2010-12,2014-) & Graduate Tutor (2010-12) for MSc in Statistics programme
- Organiser of Computational Statistics Group Meetings, UCL, 2011-2012
- Founding Member of the Greek Stochastics Group, organising annual workshops (9 so far) in Greece
- Organiser of intense 1-day stat. courses for the British Medical Association (2012-13)

## Refereed for

- AISTATS
- Annals of Applied Statistics
- Annals of Statistics
- Applied Stochastic Models in Business and the Industry
- Bayesian Analysis
- Bernoulli
- Computational Statistics and Data Analysis
- Journal of Applied Probability
- Journal of Computational and Graphical Statistics
- Journal of Economical Dynamics and Control
- Journal of Machine Learning Research
- Journal of Management Science
- Journal of Mathematical Analysis and Applications
- Journal of Multivariate Analysis
- Journal of the American Statistical Association
- Journal of the Royal Statistical Society
- Journal of Statistical Software
- Mathematical Finance
- Mathematics of Operations Research
- Methodology and Computing in Applied Probability
- Operations Research
- Physica D: Nonlinear Phenomena.
- Stochastic Processes and Applications
- Statistics and Computing
- Transactions on Modelling and Computer Simulation

## Memberships

- Fellow of Royal Statistical Society

# > Teaching

## Taught Courses

2015-16: 2nd term; Forecasting (Masters and 3rd year)
2nd term; Introductory Statistical Methods and Computing (1st year)
1st term; Probability and Inference (tutorials, 2nd year)

2014-15: 2nd term; Forecasting (Masters and 3rd year)
2nd term; Stochastic Processes (tutorials, 2nd year)
1st term; Probability and Inference (tutorials, 2nd year)

2013-14: 2nd term; Stochastic Processes II (4th year)
1st term; Advanced Topics in Applied Statistics (Masters)

2012-13: 2nd term; Stochastic Processes II (4th year)
1st term; Stochastic Systems (Masters and 3rd year)

2011-12: 2nd term; Stochastic Processes (2nd year)
1st term; Introduction to Practical Statistics (1nd year)

2010-11: 2nd term; Stochastic Processes (2nd year)
1st term; Introduction to Practical Statistics (1st year)

2009-10: 2nd term; Stochastic Processes (2nd year)
1st term; Introductory Statistical Methods and Computing (1st year)
1st term; Statistical Inference (tutorials, Masters and 3rd year)

2008-09: 2nd term; Introduction to Probability and Statistics (diploma course)
1st -2nd term; Introductory Statistical Methods and Computing (1st year)
2nd term; Statistical Inference, (Masters and 3rd year tutorials)

2007-08: 2nd term; Introduction to Modelling with SDEs (4th year)

# > Teaching

## MSc Project Supervision

2014-15: N. Chen: Integrated Nested Laplace Approximation for SV models.
J. Chen: Fitting Stochastic Volatility Model to Financial Time Series.

2011-12: M. Papamichalis: Time Series Models Driven by Fractional Brownian motion.
X. Guo: Medium-Term Risk Management for a Gas-Fired Power Plant

2009-10: A. Benhard: FX Barrier Options
E. Kuriakou: Bayesian Inference for Diffusion processes and Stoch. Volatility Models.
D. Owatemi: Valuing a Gas-Fired Power Plant: An MCMC approach.

2008-09: E. Pazos: MCMC Methods for Diffusion Bridges.
A. Mudhir: Realised Volatility for Diffusions with Jumps.