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Academic history

Imperial College London PhD in Mathematics Viva Jan. 8th 2003
Imperial College London MSci in Mathematics Aug. 2000

Employment

Alan Turing Institute	Science Committee Chair	Dec. 2015–Aug. 2016
Alan Turing Institute	UCL University Liaison Director	Oct. 2015–Aug. 2016
Alan Turing Institute	Interim Programme Committee Chair	May 2015–Dec. 2015
University College London	Honorary Senior Research Associate of Mathematics	June 2015 – present
University College London	Honorary Professor of Computer Science	June 2008 – present
University College London	Professor of Statistics	Oct. 2007–present
Imperial College London	Senior Lecturer in Statistics	Oct. 2006–Sept. 2007
Imperial College London	Lecturer in Statistics	Oct. 2002–Sept. 2006
Imperial College London	Beit Scientific Research Fellowship	Oct. 2001–Sept. 2002

Research interests

Mathematical underpinning of Data Science, network modelling, nonstationary time series and inhomogeneous random fields, multiple time series and random fields, point processes, multiscale methods, nonparametric estimation, sparsity and high dimensional data. Applications in ecology, finance, food science, geoscience, oceanography, neuroscience and medical imaging.

Strategy Papers & Commentaries

1. *Report on the 2015/6 Alan Turing Institute scoping programme.* I designed and chaired the reviewing process of over 100 scoping workshop proposals, a £500 k peer-reviewed programme. Jointly with Andrew Blake I wrote the report, available at <https://aticdn.s3-eu-west-1.amazonaws.com/2015/06/The-Alan-Turing-Institute-Scoping-Programme.pdf>.
2. *The IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems.* Contributed to https://standards.ieee.org/develop/indconn/ec/autonomous_systems.html

Journal papers

Popular science

1. S. Olhede & R. Rodrigues. 2017. The computer ate my personality, *Significance*, 14(3), 6–7.
2. S. Olhede & R. Rodrigues. 2017. Fairness and transparency in the Age of the Algorithm, *Significance*, 14(2), 8–9.
3. S. Olhede & R. Rodrigues. 2017. Theory of Data Science, *Institute of Actuaries Longevity Bulletin*.

Time series and random fields

4. A. P. Guillaumin, A. M. Sykulski, S. C. Olhede, J. J. Early & J. M. Lilly. Analysis of non-stationary modulated time series with applications to oceanographic surface flow measurements, to appear in *Journal of Time Series Analysis*.
5. A. M. Sykulski, S. C. Olhede, J. M. Lilly & J. J. Early. 2017. Frequency-Domain Stochastic Modeling of Stationary Bivariate or Complex-Valued Signals. *IEEE Transactions on Signal Processing*, 65, 3136–3151.
6. A. M. Sykulski, S. C. Olhede and J. M. Lilly. 2016. A Widely Linear Complex Autoregressive Process of Order One. *IEEE Transactions on Signal Processing*, 64, 6200–6210.
7. A. M. Sykulski, S. C. Olhede, J. M. Lilly and E. Danioux. 2016. Lagrangian Time Series Models for Ocean Surface Drifter Trajectories, *J. RSS c*, 65, 29–50.
8. S. C. Olhede, D. Ramirez and P. J. Schreier. 2014. Detecting Directionality in Random Fields Using the Monogenic Signal, *IEEE Transactions on Information Theory*, 60, 6491–6510.
9. S. C. Olhede. 2013 Modulated Oscillations in Many Dimensions, *Phil. Transactions*, 371, no 1984, 20110551.
10. J. M. Lilly and S. C. Olhede. 2012. Generalized Morse Wavelets as a Superfamily of Analytic Wavelets. *IEEE Transactions on Signal Processing*, 60, 6036–604.

11. J. M. Lilly and S. C. Olhede. 2012. Analysis of Modulated Multivariate Oscillations. *IEEE Transactions on Signal Processing*, 60, 600–612.
12. J. Lilly and S. C. Olhede. 2010. On the Analytic Wavelet Transform, *IEEE Transactions on Information Theory*, 56, 4135–4156.
13. H. Hindberg and S. C. Olhede. 2010. Estimation of Ambiguity Functions With Limited Spread, *IEEE Transactions on Signal Processing*, 58, 2383–2388.
14. J. Lilly and S. C. Olhede. 2010. Bivariate Instantaneous Frequency and Bandwidth, *IEEE Transactions on Signal Processing*, 58, 591–603.
15. S. C. Olhede and G. Metikas. 2009. The Monogenic Wavelet Transform. *IEEE Transactions on Signal Processing*, 57, 3426–3441.
16. J. Lilly and S. Olhede. 2009. Higher-Order Properties of Analytic Wavelets. *IEEE Transactions on Signal Processing*, 57, 146–160.
17. S. C. Olhede. 2008. Localisation of Geometric Anisotropy. *IEEE Transactions on Signal Processing*, 56, 2133–2138.
18. S. C. Olhede. 2007. Hyperanalytic Denoising. *IEEE Transactions on Image Processing*, 16, 1522–1537.
19. G. Metikas and S. C. Olhede. 2007. Multiple Multidimensional Morse Wavelets. *IEEE Transactions on Signal Processing*, 55, 921–936.
20. S. Olhede. 2006. On Probability Density Functions for Complex Variables. *IEEE Transactions on Information Theory*, 52, 1212–17.
21. S. Olhede and A. T. Walden. 2005. Local directional denoising. *IEEE Transactions on Signal Processing*, 53, 4725–30.
22. S. Olhede and A. T. Walden. 2005. A generalised demodulation approach to time-frequency projections for multi-component signals. *Proceeding of the Royal Society of London, Series A*, 461, 2159–79.
23. S. Olhede and A. T. Walden. 2005. Denoising Signals in Quadrature. *Festschrift for Enders Robinson*, in *Integrated Computer-Aided Engineering*, 12, 109–117.
24. S. Olhede and A. T. Walden. 2004. ‘Analytic’ Wavelet Thresholding. *Biometrika*, 91, 955–73.
25. S. Olhede, E. J. McCoy and D. A. Stephens. 2004. Large Sample Properties of the Periodogram Estimator of Seasonally Persistent Processes, *Biometrika*, 91, 613–628.
26. S. Olhede and A. T. Walden. 2004. The Hilbert Spectrum via Wavelet Projections. *Proceeding of the Royal Society of London, Series A*, 460, 955–975.
27. S. Olhede and A. T. Walden. 2003. Polarization phase relationships via multiple Morse wavelets - Part I: Fundamentals. *Proceeding of the Royal Society of London, Series A*, 459, 413–44.
28. S. Olhede and A. T. Walden. 2003. Polarization phase relationships via multiple Morse wavelets - Part II: Data Analysis. *Proceeding of the Royal Society of London, Series A*, 459, 641–657.
29. S. Olhede and A. T. Walden. 2002. Generalized Morse wavelets. *IEEE Transactions on Signal Processing*, 50, 2661–2670.

Networks

30. S. C. Olhede and Wolfe, P. J. 2014. Network histograms and universality of blockmodel approximation, *Proceedings of the National Academy of Sciences of the USA*, 111, 14722–14727.
31. A. J. Flügge, S. C. Olhede and D. J. Murrell. 2014. A method to detect sub-communities from multivariate spatial associations, *Methods in Ecology and Evolution*, 5, 1214–1224.
32. T. Bartlett, et al., 2014. A DNA methylation network interaction measure, and detection of network oncomarkers, *PLOS, One*, 9, e84573.

Continuous time processes

33. W. Yip, D. A. Stephens and S. Olhede. 2010. The Explicit Chaotic Representation of the Powers of Increments of Lévy Processes, *Stochastics*, 82, 257–290.
34. S. C. Olhede, A. Sykulski and G. Pavliotis. 2009. Frequency domain estimation of integrated volatility for Itô processes in the presence of market-microstructure noise, *Multiscale Modeling and Simulation: A SIAM Interdisciplinary Journal*, 8, 393–427.
35. W. Yip, D. A. Stephens and S. C. Olhede. 2010. Hedging strategies and minimal variance portfolios for European and exotic options in a Levy market, *Mathematical Finance*, 20, 617–646.

Bioinformatics and neuroscience

36. Chang, P et al. 2016. The development of nociceptive network activity in the somatosensory cortex of freely moving rat pups, *Cerebral Cortex*, 26, 4513–4523.
37. Fabrizi, L. et al., 2016. Encoding of mechanical nociception differs in the adult and infant brain, *Scientific Reports*, 6, 28642.
38. Bartlett, T. et al., 2013. Corruption of the Intra-Gene DNA Methylation Architecture Is a Hallmark of Cancer, *PLOS, One*, 8, e68285.
39. L. Fabrizi et al., 2013. Cortical activity evoked by an acute painful tissue-damaging stimulus in healthy adult volunteers, *J*

Neurophysiol, 109, 2393–2403.

40. S. C. Olhede and H. Ombao. 2013. Modelling and Estimation of Covariance of Replicated Modulated Cyclical Time Series, *IEEE Transactions on Signal Processing* 61, 1944–1957.
41. L. Fabrizi, R. Slater, A. Worley, J. Meek, S. Boyd, S. Olhede, and M. Fitzgerald. 2011. A Shift in Sensory Processing that Enables the Developing Human Brain to Discriminate Touch from Pain, *Current Biology*, 21, 1552–1558.
42. S. Olhede and Whitcher. 2011. Nonparametric Tests of Structure for High Angular Resolution Diffusion Imaging in Q-Space, *Annals of Applied Statistics*, 5, 1293–1327.
43. S. Olhede and A. T. Walden. 2003. Noise reduction in quadrature Doppler ultrasound using multiple Morse wavelets. *IEEE Transactions on Biomedical Engineering*, 50, 51–57.

Environmental statistics

44. S. Elipot, E. Frajka-Williams, C. W. Hughes, S. Olhede and M. Lankhorst. 2017. Observed basin-scale response of the North Atlantic Meridional Overturning Circulation to wind stress forcing, *J of Climate*, 30, 2029–2054.
45. L. M. Kalnins, F. J. Simons, J. F. Kirby, D. V. Wang & S. C. Olhede. 2015. On the robustness of estimates of mechanical anisotropy in the continental lithosphere: A North American case study and global reanalysis, *Earth Planet. Sc. Lett.*, 419, 43-51.
46. V. Harris, S. C. Olhede and M. Edwards, 2015. Multidecadal Spatial Reorganisation of Plankton Communities in the North East Atlantic, *J. Marine Systems*, 142, 16-24.
47. A. Flügge, D. Murrell and S. Olhede. 2014. A method to detect subcommunities from multivariate spatial associations, *Methods in Ecology and Evolution*, 5, 1214–1224
48. V. Harris, M. Edwards, and S. Olhede. 2014. Multidecadal Atlantic Climate Variability and its Impact on Marine Pelagic Communities, *Journal of Marine Systems*, 113, 55-69.
49. S. Elipot, C. Hughes, S. Olhede and J. Toole. 2013. Coherence of western boundary pressure at the rapid WAVE array: boundary wave adjustments or deep western boundary current advection? *Journal of Physical Oceanography*, 43, 744–765.
50. F. J. Simons and S. C. Olhede. 2013. Maximum-likelihood estimation of lithospheric flexural rigidity, initial-loading fraction, and load correlation, under isotropy. *Geoph. J. Int.*, 193, 1300–1342.
51. A. J. Flügge, S. C. Olhede, and D. J. Murrell. 2012. The memory of spatial patterns – changes in local abundance and aggregation in a tropical forest, *Ecology*, 93, 1540–1549.
52. J. M. Lilly, R. K. Scott, and S. C. Olhede. 2011. Extracting waves and vortices from Lagrangian trajectories. *Geophysical Research Letters*, 38, L23605.

Conference papers: refereed

53. T. E. Bartlett, A. M. Sykulski, S. C. Olhede, J. M. Lilly and J. J. Early. 2015. A Power Variance Test for Nonstationarity in Complex-Valued Signals. *ICMLA*.
54. S. C. Olhede, D. Ramirez and P. J. Schreier. 2012. The Random Monogenic Signal, *ICIP 2012*.
55. J. M. Lilly and S. C. Olhede. 2009. Wavelet ridge estimation of jointly modulated multivariate oscillations. *43rd Asilomar Conference on Signals, Systems, and Computers*, 452–456.
56. A. Sykulski, S. C. Olhede and G. Pavliotis. 2008. High Frequency Variability and Microstructure Bias. *Proceedings of the Isaac Newton Workshop on Inference and Estimation in Probabilistic Time-Series Models*, Cambridge UK, edited by D. Barber, A. T. Cemgil and S. Chiappa.
57. S. C. Olhede and B. Whitcher. 2008. A Statistical Framework to characterise microstructure in high angular resolution diffusion imaging. *Proceedings of the 5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro. ISBI 2008*, 899 - 902.
58. S. C. Olhede and B. Whitcher. 2008. Denoising HARDI coefficients using Spherical Wavelet Lifting. *ISMRM Toronto, Canada*, 2008.
59. H. Hindberg, A. Hanssen and S. Olhede. 2008. Thresholding the Ambiguity Function. *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech and Signal Processing*, 3773 – 3776 .
60. S. C. Olhede. 2006. Hyperanalytic Thresholding. *Proceedings of the 6th IEEE International Conference on Image Processing*, volume I, 1421 – 1424.
61. G. Metikas and S. Olhede. 2005. Multiple wavelet analysis of amplitude/ frequency modulated images. *Proceedings of the 5th IEEE International Symposium on Signal Processing and Information Technology*, Dec. 18 - 21, 284 – 288.

Conference Papers: not refereed

62. S. C. Olhede and J. M. Lilly. 2007. Multiscale Inference of Lagrangian Ocean Turbulence, *Proceedings of ISI2007*.
63. S. Olhede and G. Metikas. 2006. Multiple wavelet coherence analysis, in: E. R Dougherty, J. T. Astola, K. O. Egiazarian, (editors), *Proceedings of SPIE, Image Processing: Algorithms and Systems, Neural Networks, and Machine Learning*, SPIE, Jan. 15–18, 31 – 42.

Contributions to written discussions

64. S. Olhede. 2016. Seconding, discussion on the paper "Should we sample a time series more frequently? Decision support via multivariate spectrum estimation" by G. P. Nason, B. Powell, D. Elliott and P. A. Smith, *J. Roy. Stat. Soc. A*, 180(2), 383–384.
65. S. Olhede. 2007. Seconding, discussion on the paper "Parameter estimation for differential equations: a generalized smoothing approach" by J. O. Ramsay, G. Hooker, D. Campbell and J. Cao, *J. Roy. Stat. Soc. B*, 69(5), 772.
66. S. Olhede. 2004. Discussion on the meeting on "Statistical Inverse Problems". *J. Roy. Stat. Soc. B*, 66(3), 643.