

## Publications by Michael Sørensen:

### In refereed Publications:

- [1] Normal variance-mean mixtures and  $z$ -distributions. Co-authors: O.E. Barndorff-Nielsen and J. Kent. *Internat. Statist. Review* **50**, 1982, 145–159.
- [2] On the relation between size and distance travelled for winddriven sand grains - results and discussion of a pilot experiment using coloured sand. Co-authors: O.E. Barndorff-Nielsen and J.L. Jensen. In B.M. Sumer and A. Müller (eds.): *Mechanics of Sediment Transport*, Balkema, Rotterdam, 1982, 55–64.
- [3] On the mathematical modelling of aeolian saltation. Co-author: J.L. Jensen. In B.M. Sumer and A. Müller (eds.): *Mechanics of Sediment Transport*, Balkema, Rotterdam, 1982, 65–72.
- [4] On maximum likelihood estimation in randomly stopped diffusion type processes. *Internat. Statist. Review* **51**, 1983, 93–110.
- [5] The fascination of sand. Co-authors: O.E. Barndorff-Nielsen, P. Blæsild and J.L. Jensen. In A.C. Atkinson and S.E. Fienberg (eds.): *A Celebration of Statistics*, Springer-Verlag, New York, 1985, 57–87.
- [6] The usefulness of tests for multivariate normality in physical anthropology. Co-author: J. Boldsen. *Ossa* **9-11**, 1985, 13–28.
- [7] Estimation of some aeolian saltation transport parameters: A reanalysis of Williams' data. Co-author: J.L. Jensen. *Sedimentology* **33**, 1986, 547–558.
- [8] On sequential maximum likelihood estimation for exponential families of stochastic processes. *Internat. Statist. Review* **54**, 1986, 191–210.
- [9] Classes of diffusion-type processes with a sufficient reduction. *Statistics* **17**, 1986, 585–596.
- [10] On the incubation time distribution and the Danish AIDS data. Co-authors: J.L. Boldsen, J.L. Jensen and J. Søgaaard. *J. R. Statist. Soc. A.* **151**, 1988, 42–43.
- [11] Exponential families of stochastic processes: A unifying semimartingale approach. Co-author: U. Küchler. *Internat. Statist. Review* **57**, 1989, 123–144.
- [12] Wind shear and hyperbolic distributions. Co-authors: O.E. Barndorff-Nielsen and J.L. Jensen. *Boundary-Layer Meteorology* **49**, 1989, 417–431.
- [13] A note on the existence of a consistent maximum likelihood estimator for diffusions with jumps. In Langer, H. and Nollau, V. (eds.): *Markov Processes and Control Theory*, Akademie-Verlag, Berlin, 1989, 229–234.
- [14] Some asymptotic properties of quasi likelihood estimators for semimartingales. In Mandel, P. and Husková, M. (eds.): *Proceedings of the Fourth Prague Symposium on Asymptotic Statistics*, Charles University, Prague, 1989, 469–479.

- [15] On quasi likelihood for semimartingales. *Stoch. Processes Appl.* **35**, 1990, 331–346.
- [16] Parametric modelling of turbulence. Co-authors: O.E. Barndorff-Nielsen and J.L. Jensen. *Phil. Trans. R. Soc. Lond.* **A 332**, 1990, 439–455.
- [17] Likelihood methods for diffusions with jumps. In Prabhu, N.U. and Basawa, I.V. (eds.): *Statistical Inference in Stochastic Processes*, Marcel Dekker, New York, 1991, 67–105.
- [18] Information quantities in non-classical settings. Co-author: O.E. Barndorff-Nielsen. *Computational Statistics and Data Analysis* **12**, 1991, 143–158.
- [19] On the temporal-spatial variation of sediment size distributions. Co-author: O.E. Barndorff-Nielsen. *Acta Mechanica* [Suppl] **2**, 1991, 23–35.
- [20] An analytic model of wind-blown sand transport. *Acta Mechanica* [Suppl] **1**, 1991, 67–81.
- [21] A review of recent progress in our understanding of aeolian sediment transport. Co-authors: R.S. Anderson and B.B. Willetts. *Acta Mechanica* [Suppl] **1**, 1991, 1–19.
- [22] Methodology of sieving small samples and calibration of sieve sets. Co-authors: K. Dalsgaard and J.L. Jensen. In J.P.M. Syvitsky (ed.): *Principles, Methods, and Application of Particle Size Analysis*, Cambridge University Press, Cambridge, 1991, 64–75.
- [23] A statistical model for the streamwise component of a turbulent velocity field. Co-authors: O.E. Barndorff-Nielsen and J.L. Jensen. *Annales Geophysicae* **11**, 1993, 99–103.
- [24] Stochastic models of sand transport by wind and two related estimation problems. *Internat. Statist. Rev.* **61**, 1993, 245–255.
- [25] Exponential families of stochastic processes with time-continuous likelihood functions. Co-author: U. Küchler. *Scand. J. Statist.* **21**, 1994, 421–431.
- [26] Exponential families of stochastic processes and Lévy processes. Co-author: U. Küchler. *Journal of Statistical Planning and Inference* **39**, 1994, 211–237.
- [27] Statistical analysis of a spatial birth-and-death process model with a view to modelling linear dune fields. Co-author: J. Møller. *Scand. J. Statist.* **21**, 1994, 1–19.
- [28] A review of some aspects of asymptotic likelihood theory for stochastic processes. Co-author: O.E. Barndorff-Nielsen. *Int. Statist. Rev.* **62**, 1994, 133–165.
- [29] Martingale estimating functions for discretely observed diffusion processes. Co-author: B.M. Bibby. *Bernoulli* **1**, 1995, 17–39.
- [30] A semimartingale approach to some problems in risk theory. *ASTIN Bulletin* **26**, 1996, 15–23.

- [31] Curved exponential families of stochastic processes and their envelope families. Co-author: U. Küchler. *Ann. Inst. Statist. Math.* **48**, 1996, 61–74.
- [32] On the effect of mid-air collisions on aeolian saltation. Co-author: I. McEwan. *Sedimentology* **43**, 1996, 65–76.
- [33] On estimation for discretely observed diffusions: A review. Co-author: B.M. Bibby. *Theory of Stochastic Processes* **2 (18)**, 1996, 49–56.
- [34] The natural exponential family generated by a semimartingale. In A.N. Shiryaev et al. (eds.): *Proceedings of the Fourth Russian-Finnish Symposium on Probability Theory and Mathematical Statistics*, TVP Science Publishers, Moscow, 1996, 177–186.
- [35] On effects of discretization on estimates of drift parameters for diffusion processes. Co-authors: P.E. Kloeden, E. Platen and H. Schurz. *J. Appl. Prob.* **33**, 1996, 1061–1076.
- [36] A hyperbolic diffusion model for stock prices. Co-author: B.M. Bibby. *Finance and Stochastics* **1**, 1997, 25–41.
- [37] On the effect of time variability of the wind on rates of aeolian sand transport. *Aarhus Geoscience* **7**, 1997, 73–77.
- [38] Estimating functions for discretely observed diffusions: A review. In Basawa, I.V., Godambe, V.P. and Taylor, R.L. (eds.): *Selected Proceedings of the Symposium on Estimating Functions*. IMS Lecture Notes - Monograph Series, Vol. 32, 1997, 305–325.
- [39] On exponential families of Markov processes. Co-author: U. Küchler. *Journal of Statistical Planning and Inference* **66**, 1998, 3–19.
- [40] On comparison of stopping times in sequential procedures for exponential families of stochastic processes. *Scand. J. Statist.* **25**, 1998, 331–343.
- [41] Some stationary processes in discrete and continuous time. Co-authors: O.E. Barndorff-Nielsen and J.L. Jensen. *Adv. Appl. Prob.* **30**, 1998, 989 – 1007.
- [42] Aeolian mass transport near the saltation threshold. Co-author: K.R. Rasmussen. *Earth Surface Processes and Landforms*, **24**, 1999, 413 – 422.
- [43] Estimating equations based on eigenfunctions for a discretely observed diffusion process. Co-author: M. Kessler. *Bernoulli*, **5**, 1999, 299–314.
- [44] A note on limit theorems for multivariate martingales. Co-author: U. Küchler. *Bernoulli*, **5**, 1999, 483 – 493.
- [45] Stock returns and hyperbolic distributions. Co-authors: U. Küchler, K. Neumann and A. Streller. *Mathematical and Computer Modelling*, **29**, 1999, 1 – 15.
- [46] On asymptotics of estimating functions. *Brazilian Journal of Probability and Statistics*, **13**, 1999, 111 – 136.

- [47] Prediction-based estimating functions. *Econometrics Journal*, **3**, 2000, 123 – 147.
- [48] Simplified estimating functions for diffusion models with a high-dimensional parameter. Co-author: B.M. Bibby. *Scand. J. Statist.* **28**, 2001, 99 – 112.
- [49] Hyperbolic processes in finance. Co-author: B.M. Bibby. In S. Rachev (ed.): *Handbook of Heavy Tailed Distributions in Finance*, Elsevier Science, Amsterdam, 2003, 211 – 248.
- [50] Small-diffusion asymptotics for discretely sampled stochastic differential equations. Co-author: Masayuki Uchida. *Bernoulli*, **9**, 2003, 1051 – 1069.
- [51] On the rate of aeolian sand transport. *Geomorphology*, **59**, 2004, 53 – 62.
- [52] Estimation for discretely observed diffusions using transform functions. Co-authors: Leah Kelly and Eckhard Platen. *J. Appl. Prob.*, **41A**, 2004, 99 – 118.
- [53] Inference for observations of integrated diffusion processes. Co-author: S. Ditlevsen. *Scand. J. Statist.*, **31**, 2004, 417 – 429.
- [54] Diffusion processes. In Teugels, J. and Sund, B. (eds.): *Encyclopedia of Actuarial Science*, Wiley, Chichester, 2004, 523 – 527.
- [55] Ornstein–Uhlenbeck Process. In Teugels, J. and Sund, B. (eds.): *Encyclopedia of Actuarial Science*, Wiley, Chichester, 2004, 1229 – 1230.
- [56] Martingale estimating functions for discretely observed stochastic differential equation models. In Romanelli, S., Mininni, R.M. and Lucente, S. (eds.): *Interplay between  $(C_0)$ -semigroups and PDEs: Theory and applications*. Aracne Editrice, Rome, 2004, 213 – 236.
- [57] Probabilistic modeling of bed-load composition. Co-authors: I. McEwan, J. Heald, S. Tait, G. Cunningham, D. Goring and B.B. Willetts. *J. of Hydr. Eng.*, **130**, 2004, 129 – 139.
- [58] On time-reversibility and estimating functions for Markov processes. Co-author: Mathieu Kessler. *Statistical Inference for Stochastic Processes*, **8**, 2005, 95 – 107.
- [59] Diffusion-type models with given marginal and autocorrelation function. Co-authors: Bo Martin Bibby and Ib Michael Skovgaard. *Bernoulli*, **11**, 2005, 191 – 220.
- [60] Statistical inference for discretely observed Markov jump processes. Co-author: Mogens Bladt. *J. Roy. Statist. Soc. B*, **67**, 2005, 395 – 410.
- [61] Dynamics of particles in aeolian saltation. Co-author: Keld Rømer Rasmussen. In García-Rojo, R., Herrmann, H.J. and McNamara, S. (eds.): *Powders and Grains 2005*, Vol. 2, Balkema, Rotterdam, 2005, 967 – 972.
- [62] Diffusion models for exchange rates in a target zone. Co-author: Kristian Stegenborg Larsen. *Mathematical Finance*, **17**, 2007, 285 – 306.
- [63] The Pearson diffusions: A class of statistically tractable diffusion processes. Co-author: Julie Lyng Forman. *Scand. J. Statist.*, **35**, 2008, 438 – 465.

- [64] The vertical variation of particle speed and flux density in aeolian saltation: measurement and modeling. Co-author: Keld Rømer Rasmussen. *J. Geophys. Res.*, **113**, 2008, F02S12, doi:10.1029/2007JF000774.
- [65] Efficient estimation of transition rates between credit ratings from observations at discrete time points. Co-author: Mogens Bladt. *Quantitative Finance*, **9**, 2009, 147 – 160.
- [66] Estimation for stochastic differential equations with a small diffusion coefficient. Co-author: Arnaud Gloter. *Stoch. Proc. Appl.*, **119**, 2009, 679 – 699.
- [67] Parametric inference for discretely sampled stochastic differential equations. In Andersen, T.G. Davis, R.A., Kreiss, J.-P. and Mikosch, T. (eds.): *Handbook of Financial Time Series*, Springer, Heidelberg, 2009, 531 – 553.
- [68] Estimating functions for discretely sampled diffusion-type models. Co-authors: Bo Martin Bibby and Martin Jacobsen. In Ait-Sahalia, Y. and Hansen, L.P. (eds.): *Handbook of Financial Econometrics*, North Holland, Oxford, 2010, 203 – 268.
- [69] A simple estimator for discrete-time samples from affine stochastic delay differential equations. Co-author: Uwe Küchler. *Statistical Inference for stochastic Processes*, **13**, 2010, 125 – 132.
- [70] Maximum likelihood estimation for integrated diffusion processes. Co-author: Fernando Baltazar-Larios. In Chiarella, C. and Novikov, A. (eds.): *Contemporary Quantitative Finance: Essays in Honour of Eckhard Platen*, Springer, Heidelberg, 2010, 407 – 423.
- [71] Prediction-based estimating functions: review and new developments. *Brazilian Journal of Probability and Statistics*, **25**, 2011, 362 – 391.
- [72] Estimating functions for diffusion-type processes. In Kessler, M., Lindner, A. and Sørensen, M. (eds.): *Statistical Methods for Stochastic Differential Equations*, CRC Press - Chapman and Hall, 2012, 1 – 107.
- [73] Statistical inference for discrete-time samples from affine stochastic delay differential equations. Co-author: Uwe Küchler. *Bernoulli*, **19**, 2013, 400 – 425.
- [74] Simple simulation of diffusion bridges with application to likelihood inference for diffusions. Co-author: Mogens Bladt. *Bernoulli*, **20**, 2014, 645 – 675.
- [75] A transformation approach to modeling multi-modal diffusions. Co-author: Julie Lyng Forman. *Journal of Statistical Planning and Inference*, **146**, 2014, 56 – 69.
- [76] On the size distribution of sand. In Podolskij, Stelzer, Thorbjørnsen and Veraart (eds.): *Probability, Statistics and Their Applications*, Springer, 2016, 1 – 13.
- [77] Simulation of multivariate diffusion bridges. Co-authors: Mogens Bladt and Samuel Finch. *J. Roy. Statist. Soc. B*, **78**, 2016, 343 – 369.
- [78] Efficient estimation for diffusions sampled at high frequency over a fixed time interval. Co-author: Nina Munkholt Jakobsen. *Bernoulli*, **23**, 2017, 1874 – 1910.

- [79] Introduction to the paper “Likelihood ratio tests in curved exponential families with nuisance parameters present only under the alternative”. Co-author: Nina Munkholt Jakobsen. In Nancy Reid and Torben Martinussen (eds.): *Inference, Asymptotics, and Applications – Selected papers of Ib Michael Skovgaard, with Introductions by his colleagues*, World Scientific, 2017, 301 – 307.
- [80] A generative angular model of protein structure evolution. Co-authors: Michael Golden, Eduardo García-Portugués, Kanti V. Mardi, Thomas Hamelryck, and Jotun Hein. To appear in *Molecular Biology and Evolution*.
- [81] Langevin diffusions on the torus: estimation and applications. Co-authors: Eduardo García-Portugués, Kanti V. Mardi and Thomas Hamelryck. Preprint arXiv:1705.00296, 2017. To appear in *Statistics and Computing*.

**Miscellaneous short contributions:**

- [82] Review of the book “Semimartingales and Their Statistical Inference” by B.L.S. Prakasa Rao. *J. Amer. Statist. Ass.*, **95**, 2000, 1016 – 1017.
- [83] Contribution to the discussion of the paper “Bayesian analysis of single-molecule experimental data” by Kou, Xie and Liu. Co-author: Martin Jacobsen. *J. Roy. Statist. Soc., ser. C*, **54**, 2005, 502 – 503.
- [84] Contribution to the discussion of the paper “Local model uncertainty and incomplete-data bias” by John Copas and Shinto Eguchi. *J. Roy. Statist. Soc., ser. B*, **67**, 2005, 500 – 501.
- [85] Comment: A selective overview of nonparametric methods in financial econometrics. *Statistical Science*, **20**, 2005, 344 – 346.
- [86] Ole E. Barndorff-Nielsen’s scientific achievements. Co-authors: Eva B. Vedel Jensen, Mark Podolskij and Steen Thorbjørnsen. In Podolskij, Stelzer, Thorbjørnsen and Veraart (eds.): *Probability, Statistics and Their Applications*, Springer, 2016, xi – xvi.

**Books:**

- [87] Küchler, U. and Sørensen, M. (1997): *Exponential Families of Stochastic Processes*. Springer-Verlag, New York.
- [88] Dehling, H.G., Mikosch, T. and Sørensen, M. (eds.) (2002): *Empirical Process Techniques for Dependent Data*. Birkhäuser, Boston.
- [89] Kessler, M., Lindner, A. and Sørensen, M. (eds.) (2012): *Statistical Methods for Stochastic Differential Equations*. CRC Press - Chapman and Hall.
- [90] Jensen, J.L. and Sørensen, M. (2015): *Statistical Principles: A First Course*. Lecture Notes, University of Copenhagen.

## Proceedings:

- [91] Huebner, M. and Sørensen, M. (eds.) (2001): *Mini-proceedings: Workshop on Stochastic Partial Differential Equation – Statistical Issues and Applications*. Centre for Mathematical Physics and Stochastics, Miscellanea No. 20.
- [92] Huebner, M. and Sørensen, M. (eds.) (2004): *Workshop on Dynamical Stochastic Modelling in Biology*. Network for Mathematical Physics and Stochastics, Miscellanea No. 26.

## Other Publications:

- [93] The Hanstholm experiment 1982. Sand grain saltation on a beach. Co-authors: J.L. Jensen, K. Rømer Rasmussen and B.B. Willetts. Research Report 125, 1984, Department of Theoretical Statistics, University of Aarhus, 66 p.
- [94] Statistical analysis of the variation of the oxygen concentration in a river by means of diffusion processes. Co-author: M. Erlandsen. In L.S. Mortensen (ed.): *Applied Statistics Symposium*, January 1984, RECAU, Aarhus, 1984, 421–431.
- [95] Estimation of some aeolian saltation transport parameters from transport rate profiles. *Proceedings of the International Workshop on the Physics of Blown Sand*, 141–190. Memoirs No. 8, 1985, Department of Theoretical Statistics, University of Aarhus.
- [96] Windtunnel tracer studies of grain progress. Co-authors: O.E. Barndorff-Nielsen, J.L. Jensen, H.L. Nielsen and K.R. Rasmussen. *Proceedings of the International Workshop on the Physics of Blown Sand*, 243–251. Memoirs No. 8, 1985, Department of Theoretical Statistics, University of Aarhus.
- [97] Measurement of saltation and wind strength on beaches. Co-authors: K.R. Rasmussen and B.B. Willetts. *Proceedings of the International Workshop on the Physics of Blown Sand*, 301–325. Memoirs No. 8, 1985, Department of Theoretical Statistics, University of Aarhus.
- [98] Laboratory studies of flow over dunes. Co-authors: K.R. Rasmussen and H. Tsoar. *Proceedings of the International Workshop on the Physics of Blown Sand*, 327–349. Memoirs No. 8, 1985 Department of Theoretical Statistics, University of Aarhus.
- [99] On the motion of small particles in a turbulent wind field. *Bulletin of the International Statistical Institute*, Proceedings of the 46th Session, 1987, 2 p.
- [100] Estimation for diffusion processes observed with measurement errors. Co-author: E. Ejlsing. In L.S. Mortensen (ed.): *Applied Statistics Symposium*, January 1987, UNI · C, Aarhus, 1987, 355–366.
- [101] Sand transport studies in a wind tunnel using radioactive grains. Report on a pilot experiment. Co-authors: O.E. Barndorff-Nielsen, J.L. Jensen, H.L. Nielsen and K.R. Rasmussen. Research Report 140, 1988, Department of Theoretical Statistics, University of Aarhus, 28 p.

- [102] Radioactive tracer studies of grain progress in aeolian sand transport. A statistical analysis. Research Report 141, 1988, Department of Theoretical Statistics, University of Aarhus, 38 p.
- [103] Stochastic models of sand transport by wind and two related estimation problems. *Bulletin of the International Statistical Institute*, Proceedings of the 48th Session, 1991, 19 p.
- [104] On the moments of some first passage times for exponential families of processes. Research Report 302, 1994, Department of Theoretical Statistics, University of Aarhus.
- [105] On exponential families of discrete time stochastic processes. Research Report 351, 1996, Department of Theoretical Statistics, University of Aarhus.
- [106] Exponential family inference for diffusions models. Research Report 383, 1997, Department of Theoretical Statistics, University of Aarhus.
- [107] Small dispersion asymptotics for diffusion martingale estimating functions. Preprint No. 2000-2, Department of Theoretical Statistics, University of Copenhagen.
- [108] On the rate of aeolian sand transport. In Moctar, A.O.E. (ed.): *Formation et Migration des Dunes*, 2001, 56 – 60. Université de Nouakchott, Mauritania.
- [109] Optimal inference in diffusion models of the short rate of interest. Co-authors: Bent Jesper Christensen and Rolf Poulsen. Working Paper No. 102, 2001, Centre for Analytical Finance, University of Aarhus.
- [110] Martingale estimating functions in financial econometrics. *Bulletin of the 56th Session of the International Statistical Institute*, 2007, 6 p.
- [111] Efficient estimation for ergodic diffusions sampled at high frequency. 2008 Preprint, Department of Mathematical Sciences, University of Copenhagen.
- [112] Optimal inference in dynamic models with conditional moment restrictions. Co-author: Bent Jesper Christensen. Creates Preprint, 2008.
- [113] Estimating functions for jump-diffusions. Co-author: Nina Munkholt Jakobsen. Preprint arXiv:1709.00232, 2017.

**Lecture Notes in Danish:**

- [114] Basal Statistik, Department of Theoretical Statistics, University of Aarhus, 1997.
- [115] En Introduktion til Sandsynlighedsregning, Department of Applied Mathematics and Statistics, University of Copenhagen, 2005.