



Mogens Bladt

Professor

 15 June 1966

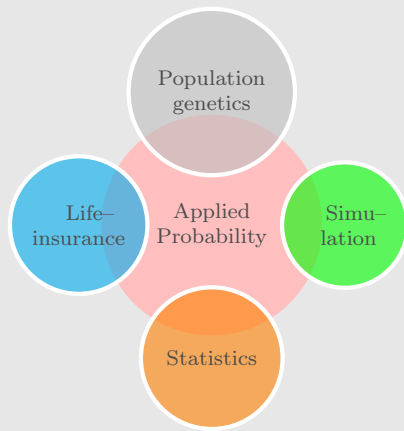
 Department of Mathematical Sciences, Universitetsparken 5, DK-2100 Copenhagen

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Working Area



Current projects:

- Data science for matrix distributions
- Phase-type distributions in Populations Genetics
- Statistics and simulation of diffusion processes
- Heavy tailed distributions
- Matrix representations in life insurance and survival analysis

Software spinoff:

- R package "ctmcd" for Markov jump processes (based on Bladt & Sørensen (2005,2009))
- R package "sde" routine for simple diffusion bridge simulation. (Related to M. Bladt & M. Sørensen (2013)).
- R package "PhaseType". (MCMC fitting based on M. Bladt, A. Gonzalez & S. L. Lauritzen (2003)).
- R package "matrixdist". (General PH fitting based on Albrecher, Bladt & Ys-las (2020).

Education

1985-1991	Master of Science Majoring in Statistics	University of Aarhus
1991-1993	PhD (Supervisor: Søren Asmussen) Algorithmic methods in Applied Probability	University of Aalborg
1989-1990	Exchange Student Master thesis under D.R. Cox	University of Oxford

Employments

1994-2018	Researcher Institute for Applied Mathematics	National Autonomous University of Mexico
2018-	Professor Department of Mathematical Sciences	University of Copenhagen
2001-2002	Visiting Professor Laboratory of Insurance Mathematics	University of Copenhagen
2007-2008	Visiting Professor Institute for Mathematical Modelling	DTU
2015-2017	Visiting Professor Department of Mathematical Sciences	University of Copenhagen

Summary of publications and more

Articles	38 peer reviewed articles
Book	Mogens Bladt and Bo Friis Nielsen. Matrix-exponential distributions in applied probability, volume 81. Springer, 2017
Citations	1334
h-index	18
Link	Google Scholar

Notice that the order of authors are alphabetical for all papers but for two exemptions:[2] and [10].

Awards

2020	EAJ Best Paper Award / GAUSS-Prize of the German Society of Insurance and Financial Mathematics (DGVFM) and the German Actuarial Association (DAV) for the paper "Matrix representations of life insurance payments", [2].
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Academic-Administrative work


- Associate Editor, Stochastic Models, 1997-2020.
- Associate Editor, Journal of Applied Probability, 2020-.
- Founder of Master programme in Financial Mathematics, National Autonomous University of Mexico.
- Department Chair, Department of Statistics, National Autonomous University of Mexico.
- Numerous Diploma courses for industry and financial sector.

Industrial interactions and grants

- Science foundation grants (Mexico) in 1997, 2007.
- Project with Mexico City police concerning crime prediction.
- Project with Mexican Supreme Court regarding capacity prediction.
- External funding, Danish research council, 2007-2008, No. 274-07-0090.
- Numerous Diploma courses for industry and financial sector.

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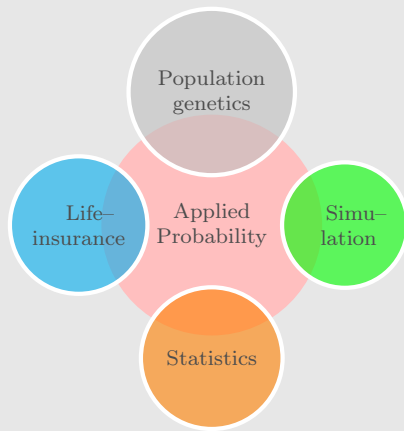
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Teaching and supervision

- Graduate courses in Applied Probability, Stochastic processes, time-series analysis, simulation, risk theory, finance, inference for stochastic processes, life-insurance.
- Undergraduate courses in numerical analysis, time-series analysis, risk theory and Applied Probability.
- Supervision of 13 Bachelor thesis.
- Supervision of 10 Master thesis.
- Supervision of 6 PhD thesis.

Selected publications

For a full publication list, follow this link.

* References

- [1] Hansjörg Albrecher, Martin Bladt, and [Bladt, Mogens](#). Matrix mittag-leffler distributions and modeling heavy-tailed risks. *Extremes*, 23:425–450, 2020.
- [2] Hansjörg Albrecher, Martin Bladt, and [Bladt, Mogens](#). Multivariate fractional phase-type distributions. *Fractional Calculus and Applied Analysis*, 23(5):1431–1451, 2020.
- [3] Hansjörg Albrecher, Martin Bladt, and [Bladt, Mogens](#). Multivariate matrix mittag-leffler distributions. *Annals of the Institute of Statistical Mathematics*, pages 1–26, 2020.
- [4] Hansjörg Albrecher and [Bladt, Mogens](#). Inhomogeneous phase-type distributions and heavy tails. *Journal of Applied Probability*, 56(4):1044–1064, 2019.
- [5] Hansjörg Albrecher, [Bladt, Mogens](#), and Jorge Yslas. Fitting inhomogeneous phase-type distributions to data: the univariate and the multivariate case. *Scandinavian Journal of Statistics*, pages 1–34, 2020.
- [6] [Bladt, Mogens](#), Søren Asmussen, and Mogens Steffensen. Matrix representations of life insurance payments. *European Actuarial Journal*, pages 1–39, 2020.
- [7] [Bladt, Mogens](#), Luz Judith R. Esparza, and Bo Friis Nielsen. Fisher information and statistical inference for phase-type distributions. *Journal of Applied Probability*, 48(A):277–293, 2011.
- [8] [Bladt, Mogens](#), Samuel Finch, and Michael Sørensen. Simulation of multivariate diffusion bridges. *Journal of the Royal Statistical Society: Series B: Statistical Methodology*, pages 343–369, 2016.
- [9] [Bladt, Mogens](#), Bo Friis Nielsen, and Oscar Peralta. Parisian types of ruin probabilities for a class of dependent risk-reserve processes. *Scandinavian Actuarial Journal*, 2019(1):32–61, 2019.
- [10] [Bladt, Mogens](#) and Leonardo Rojas-Nandayapa. Fitting phase-type scale mixtures to heavy-tailed data and distributions. *Extremes*, 21(2):285–313, 2018.
- [11] [Bladt, Mogens](#) and Michael Sørensen. Statistical inference for discretely observed markov jump processes. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 67(3):395–410, 2005.
- [12] [Bladt, Mogens](#), Michael Sørensen, et al. Simple simulation of diffusion bridges with application to likelihood inference for diffusions. *Bernoulli*, 20(2):645–675, 2014.
- [13] [Mogens Bladt](#), Antonio Gonzalez, and Steffen L. Lauritzen. The estimation of phase-type related functionals using markov chain monte carlo methods. *Scandinavian Actuarial Journal*, 2003(4):280–300, 2003.
- [14] [Mogens Bladt](#) and Michael Sørensen. Efficient estimation of transition rates between credit ratings from observations at discrete time points. *Quantitative Finance*, 9(2):147–160, 2009.
- [15] Asger Hobolth, Arno Siri-Jegousse, and [Bladt, Mogens](#). Phase-type distributions in population genetics. *Theoretical population biology*, 127:16–32, 2019.

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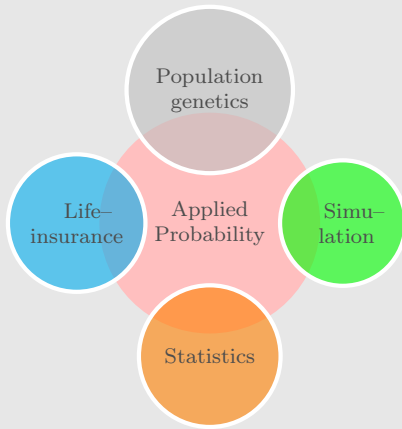


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Short summary of research career

Throughout my entire career, most of my research have been concerned with Markov processes and matrix-exponential distributions from theoretical, applications and statistical points of view.

In the early days I was concerned with queueing theory and risk models which could be parametrised by (generator) matrices and which allowed for explicit solutions to basic properties like waiting time distributions, queue lengths or solvency measures like ruin probabilities.

Soon after I developed a more integral point of view regarding the concept of "applications", which I believe must include the possibility of calibration or statistical assessment from data. A series of papers ranging from Markov chain Monte Carlo methods for phase-type estimation to discretely observed Markov jump processes and diffusions was developed, in particular with Michael Sørensen. These papers brought involvement into simulation methodology as well.

Most recently I have been concerned with the extension of the aforementioned theory to phase-type distributions based on time-inhomogeneous Markov processes. Whereas a phase-type distribution may be seen as the natural extension of an exponential distribution by replacing its intensity parameter by a matrix, for the time-inhomogeneous extension the same is true for a number of other distributions, like e.g. Pareto, Weibull and Gompertz. This involves so-called functional calculus which deals with general functions of matrices. This elegant theory has turned out to be extremely powerful in expressing distributional properties in terms of simple functions of matrices.

Short summary of teaching track record

I have been teaching courses among others in Probability, Applied Probability, Stochastic Processes, Statistics, Risk theory, Finance, Life Insurance, Time-series Analysis and Numerical Analysis. They have been taught at all levels: bachelor, master, PhD or as diploma courses offered to the industry. Most course have taught in Mexico, but still around 10 courses in Denmark. I have supervised 6 PhD theses, 10 Master theses and 13 Bachelor theses/projects.