



CONTACT
INFORMATION

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BORN

January 29, 1977

CITIZENSHIP

Sweden

RESEARCH
INTERESTS

My research interest is multivariate statistics, focusing on multivariate (vector-) normal distribution with a patterned covariance matrix, for example a covariance matrix with a banded structure. I have also considered a Growth Curve model (bilinear regression) with a linearly structured covariance matrix, e.g., banded, Toeplitz, special structure with zeros or some mix.

Right now, I am working on high-dimensional data for the Growth Curve model. This problem is challenging since the maximum likelihood estimator for the mean is a weighted estimator with the inverse of the sample covariance matrix and the sample covariance matrix is singular for high-dimensional data.

Another research interest is the Kronecker structured covariance matrix which leads to a matrix normal distribution or more general the multilinear normal distribution, i.e., a tensor normal distribution. The Kronecker structured model can for example be used in the purpose to model dependent multilevel observations.

ACADEMIC
DEGREES

Linköping University, Linköping, Sweden

– Docent in Mathematical Statistics, March 2016.

- Seminar title (in Swedish): *Klassiska tillväxtkurvor, måntrade kovariansmatriser och högdimensionell statistik*

- Doctor of Philosophy PhD (Teknologie doktor), Mathematical Statistics, 2009.
 - PhD thesis: *Studies in Estimation of Patterned Covariance Matrices*
- Licentiate of Engineering (Teknologie licentiat), Mathematical Statistics, 2007.
 - Licentiate thesis: *Testing Spatial Independence using a Separable Covariance Matrix*
- Master of Science in Applied Physics and Electrical Engineering, 2003.

ACADEMIC
EXPERIENCE

Linköping University, Linköping, Sweden

- *Head of Division* - Mathematical Statistics, Department of Mathematics, Linköping University

January 2016 to present

- *Associate Professor*, Department of Mathematics, Mathematical Statistics, Linköping University

March 2016 to present

- *Assistant Professor*, Department of Mathematics, Mathematical Statistics, Linköping University

April 2012 to March 2016

- *Research Associate*, Department of Mathematics, Mathematical Statistics, Linköping University

July 2009 to April 2012

RESEARCH VISITS

- Department of Statistics, P. J. Safarik University, Kosice, Slovakia.

June 2011

- Department of Statistics, University of Toronto, Canada.

April 2014

March 2013, August 2013

May 2011

October 2009

May 2008 to October 2008

- Department of Biometry and Informatics, Otto-von-Guericke-Universität, Magdeburg, Germany.

December 2005

BIBLIOGRAPHY

Thesis

- Ohlson, M. (2009). Studies in Estimation of Patterned Covariance Matrices. Doctor of Philosophy PhD (Teknologie doktor), Mathematical Statistics, Linköping University, Linköping, Sweden.
- Ohlson, M. (2007). Testing Spatial Independence using a Separable Covariance Matrix. Licentiate of Engineering (Teknologie licentiat), Mathematical Statistics, Linköping University, Linköping, Sweden.

20. Evarest, E., Berntsson, F., Singull, M. and Charles, W. (2017). Regime switching models on temperature dynamics. *International Journal of Applied Mathematics and Statistics* 56(2):19-36.
19. Habyarimana, C., Singull, M. and Nzabanita, J. (2017). Estimation of Parameters in the Growth Curve Model with a Linearly Structured Covariance Matrix - A Simulation Study. *International Journal of Scientific Engineering and Technology* 6(1):45-49.
18. Pielaszkiwicz, J., von Rosen, D. and Singull, M. (2015). On $E[\prod_{i=0}^k tr\{W^{m_i}\}]$, where $W \sim \mathcal{W}_p(I, n)$. *Communications in Statistics - Theory and Methods* 46(6):2990-3005.
17. Srivastava, M. S. and Singull, M. (2017). Test for the mean matrix in a Growth Curve model for high dimensions. *Communications in Statistics - Theory and Methods* 46(13):6668-6683.
16. Srivastava, M. S. and Singull, M. (2016). Testing sphericity and intraclass covariance structures under a Growth Curve model in high dimension. Accepted for publication in *Communications in Statistics - Simulation and Computation*.
15. Ngaruye, I., von Rosen, D. and Singull, M. (2016). Crop yield estimation at district level for agricultural seasons 2014 in Rwanda. *African Journal of Applied Statistics* 3(1):69-90.
14. Ngaruye, I., Nzabanita, J., von Rosen, D. and Singull, M. (2016). Small Area Estimation under a multivariate linear model for repeated measures Data. Accepted for publication in *Communications in Statistics - Theory and Methods*.
13. Nzabanita, J., von Rosen, D. and Singull, M. (2015). Bilinear regression model with Kronecker and linear structures for the covariance matrix. *Afrika Statistika* 10(2):827-837.
12. Nzabanita, J., von Rosen, D. and Singull, M. (2015). Extended GMANOVA model with a linearly structured covariance matrix. *Mathematical Methods of Statistics* 24(4):280-291.
11. Karlsson, E. and Singull, M. (2015). More on explicit estimators for a banded covariance matrix. *Acta et Commentationes Universitatis Tartuensis de Mathematica* 19(1):49-62.
10. Pielaszkiwicz, J., von Rosen, D. and Singull, M. (2014). Free cumulant-moment relation formula. *Acta et Commentationes Universitatis Tartuensis de Mathematica* 18(2):265-278.
9. Ohlson, M., Ahmad, M. R. and von Rosen, D. (2013). The multilinear normal distribution: introduction and some basic properties. *Journal of Multivariate Analysis* 113:37-47.
8. Ahmad, M. R., von Rosen, D. and Singull, M. (2013). A note on mean testing for high dimensional multivariate data under non-normality. *Statistica Neerlandica* 67(1):81-99.
7. Srivastava, M. S. and Singull, M. (2012). Profile analysis with random-effects covariance structure. *Journal of the Japan Statistical Society* 42(2):145-164.

6. Nzabanita, J., von Rosen, D. and Singull, M. (2012). Estimation of parameters in the extended Growth Curve model with linearly structured covariance matrix. *Acta et Commentationes Universitatis Tartuensis de Mathematica* 16(1):13–32.
5. Singull, M. and Koski, T. (2012). On the distribution of matrix quadratic forms. *Communications in Statistics - Theory and Methods* 41(18):3403–3415.
4. Singull, M., Ahmad, M. R. and von Rosen, D. (2012). More on the Kronecker structured covariance matrix. *Communications in Statistics - Theory and Methods* 41(13-14):2512–2523.
3. Ohlson, M., Andrushchenko, Z. and von Rosen, D. (2011). Explicit estimators under m-dependence for a multivariate normal distribution. *Annals of the Institute of Statistical Mathematics* 63(1):29–42.
2. Ohlson, M. and Srivastava, M. S. (2010). Profile analysis for a Growth Curve model. *Journal of The Japan Statistical Society* 40(1):1–21.
1. Ohlson, M. and von Rosen, D. (2010). Explicit estimators of parameters in the Growth Curve model with linearly structured covariance matrices. *Journal of Multivariate Analysis* 101(5):1284–1295.

Conference paper (Refereed)

1. Pielaszkiwicz J., von Rosen D., and Singull M. (2017). Testing Independence via Spectral Moments. In: Bebiano N. (eds) Applied and Computational Matrix Analysis. MAT-TRIAD 2015. Springer Proceedings in Mathematics & Statistics, vol 192. Springer, Cham

CONFERENCES
AND LECTURES

Conferences as invited speaker

- IWMS 2015, May 25-28 2015, Haikou, China – Invited speaker in *Mini-symposium on Linear and Mixed Models*. Title: *Testing sphericity and intraclass covariance structures under a growth curve model in high dimension*.
- AISC 2014, October 10-12 2014, University of North Carolina at Greensboro, USA – Invited Speaker in *Special session on Recent advances in multivariate theory and its application*. Title: *Test for the mean in a Growth Curve model for high dimensions*.
- JSM 2014, August 2-7 2014, Boston, Massachusetts, USA – Invited Speaker in *Topic-Contributed Session on Analysis with Kronecker product structured covariance matrices*. Title: *Expectation-maximization algorithm for the multilinear normal distribution*.
- IWMS 2013, August 12-15 2013, Toronto, Canada – Invited speaker in *Special Session on Perspectives on High Dimensional Data Analysis*. Title: *Test for the mean in a Growth Curve model in high dimension*.

INTERNATIONAL
COLLABORATIONS

Among others *Muni Srivastava*, University of Toronto, Canada, *Miguel Fonseca*, Universidade Nova de Lisboa, *Carlos A. Coelho*, Universidade Nova de Lisboa, *Daniel Klein*, P. J. Safarik University, Slovakia, *Ivan Zezula*, P. J. Safarik University, Slovakia, *Katarzyna Filipiak*, Poznan University of Life Sciences, Poland.

REFeree ASSIGN-
MENTS FOR JOUR-
NALS Among others Journal of Multivariate Analysis, Linear Algebra and its Applications, Communications in Statistics - Theory and Methods, Journal of Statistical Planning, Computational Statistics and Data Analysis, Metrika.

SUPERVISION Graduated PhD-students

- Joseph Nzabanita (co-supervisor)
 - PhD thesis (June 2015): *Bilinear and Trilinear Regression Models with Structured Covariance Matrices*
Awarded the *Cramér Prize 2016*, e.g., best thesis in statistics and mathematical statistics 2015 in Sweden.
 - Licentiate thesis (May 2012): *Estimation in Multivariate Linear Models with Linearly Structured Covariance Matrices*
- Jolanta Pielaszkiewicz (co-supervisor)
 - PhD thesis (December 2015): *Contributions to High-Dimensional Analysis under Kolmogorov Condition*
 - Licentiate thesis (June 2013): *On the asymptotic spectral distribution of random matrices – Closed form solutions using free independence*
- Innocent Ngaruye (main supervisor)
 - PhD thesis (June 2017): *Contributions to Small Area Estimation: Using Random Effects Growth Curve Model*
 - Licentiate thesis (December 2014): *Small Area Estimation for Multivariate Repeated Measures Data*
- Emanuel Evarest (main supervisor)
 - Licentiate thesis (August 2017): *Modelling Weather Dynamics for Weather Derivatives Pricing*

Supervisor of 2 PhD-theses (ongoing)

- Beatrice Byukusenge (main supervisor, started 2015)
 - Project title: *Mixed Effects Space Time Modeling*
- John Andongwisye (co-supervisor, started 2013)
 - Licentiate thesis (September/October 2017): *Asset Liability Management for Tanzania Pension Funds*

Advisor and/or examiner of more than 20 undergraduate master theses.

PEDAGOGICAL
SKILLS

Pedagogical Courses:

- Teaching in Higher Education, Step 1. Learning, Instructing and Knowledge, 6hp, Linköping University, Linköping, Sweden.
- Teaching in Higher Education, Step 2. Designing, Evaluating and Organizing Learning, 6hp, Linköping University, Linköping, Sweden.
- Teaching in Higher Education, Step 3. Research Supervision, Linköping University, Linköping, Sweden.

Teaching Experience:

- Mathematical Statistics (Statistical Inference)
- Multivariate Statistics
- Generalized Linear Models
- Design and Analysis of Experiments
- Stochastic Processes
- Probability Theory
- Foundation Course in Mathematics
- Calculus
- Financial Mathematics

COMMISSIONS OF TRUST

Assistant director for the *Research School in Interdisciplinary Mathematics* at Linköping University.

April 2016 to present

Deputy Team Leader for the sub-programme Applied Mathematics and Statistics part of University of Rwanda – Sweden Research, Higher Education and Institutional Advancement Cooperation Programme.

January 2015 to present

Member of the board of Department of Mathematics, Linköping University.

January 2015 to present

Member of the board of Cramérsällskapet (part of the Swedish Statistical Society).

March 2014 to March 2016

Member of the board of Studies for Industrial Engineering and Logistics, Linköping University.

January 2012 to present

Chair of organizing committee for the *International Conference on Trends and Perspectives in Linear Statistical Inference* (LinStat2014) hold 24-28 August, 2014 at Linköping University, Sweden.

August 2014

Member of the organizing committee for the *International Conference on Trends and Perspectives in Linear Statistical Inference* (LinStat'2012) and the 21st *International Workshop on Matrices and Statistics* (IWMS 2012), 16-20 July 2012 at Bedlewo near Poznan, Poland.

July 2012

Member of the organizing committee for the *Workshops on Inverse Problems, Data, Mathematical Statistics and Ecology* 2011 at Linköping University.

August 2011