Curriculum vitae, Mikkel N. Schmidt

Personalia

Name	Mikkel N. Schmidt
Address	Store Mølle Vej 17, 1. tv. 2300 København S. Denmark
Birth date	6 July 1978
Nationality	Danish

Education

2012	**Programme for PhD supervisors** LearningLab, Technical University of Denmark
2011	**Education in University Teaching** LearningLab, Technical University of Denmark Teaching and Learning (Module 1) Teaching Methods and Course Planning (Module 2) Teaching and Teacher Development (Module 3) Teaching Development Project (Module 4)
2008	**Ph.D. in Mathematical Modeling** Technical University of Denmark Thesis: "Single-channel source separation using non-negative matrix factorization" Supervisor: Associate Professor Jan Larsen
2003	**M.Sc. in Electronic and Electrical Engineering** Aalborg University Specialization: Speech Communication, Signal Processing Masters thesis grade: 11
2001	**B.Sc. in Engineering** Herning Institute of Business Administration and Technology Grade point average: 11.2

Employment

2013–	**Associate Professor** DTU Informatics, Technical University of Denmark
2012	**Assistant Professor** DTU Informatics, Technical University of Denmark
2011–2012	**Postdoctoral researcher** DTU Informatics, Technical University of Denmark Network for Danish Audio Technology.
2009–2011	**Postdoctoral researcher** DTU Informatics, Technical University of Denmark Grant from Danish Research Council, 2 years
2008–2009	**Postdoctoral researcher** University of Cambridge Grant from Villum Kann Rasmussen, 1 year
2008	**Postdoctoral researcher** DTU Informatics, Technical University of Denmark, 7 months
2007	**Visiting Ph.D. student** LabROSA, Columbia University, New York, 6 months
2005–2008	**Ph.D. student** DTU Informatics, Technical University of Denmark, 3 years

Teaching experience

Courses

2014–	Introduction to programming and data processing (course responsible)
2013–	Audio information processing systems (course responsible)
2012–	Programming of mathematical software (course responsible)

2010–12	Introduction to machine learning and data modeling (course responsible/lecturer)
2010–11	Machine learning for signal processing (lecturer/group supervisor)
2011	Non-linear signal processing (teaching assistant)
2005–06, 2010–12	Digital signal processing (lecturer/teaching assistant)
2008, 2010–11	Advanced digital signal processing (lecturer)
2006–07	Applied digital signal processing (group supervisor)
2006	Introduction to computer systems (teaching assistant)

Thesis supervision

- 4 Bachelor's student.
- 16 Master's students.
- 7 Ph.D. students.

Grants and stipends

- The Danish Council for Independent Research, Technology and Production Sciences
  Postdoc grant, 2009, 2 years, DKK 1.664.198
- Villum Kann Rasmussen Postdoc scholarship
  Postdoc grant, 2008, 1 year
- Marie & M. B. Richters Fond, Oticon Fonden, and Otto Mønsteds Fond, 2007
  Financial support for external research at Columbia University
- Technical University of Denmark
  Ph.D. stipend, 2005, 3 years

Research interests

Research statement

Statistical models are used in all areas of science to describe stochastic relations between variables. In statistical modeling, probability theory is used to describe the uncertaincy that is present due to inaccurate measurements, model mismatch, missing data, etc. The process of drawing conclusions based on statistical models is called statistical inference. The aim of my research is to develop novel statistical methodology, which includes:

1. Formulating probabilistic models and devising procedures for computational inference, evaluation, and validation.
2. Applying the developed methodology to solve problems in various application areas in science and industry.

Keywords

Bayesian statistical models. Machine learning for supervised and unsupervised learning. Latent variable models and source separation. Approximate inference in statistical and probabilistic models. Non-parametric Bayesian data analysis.

Scientific publications and citations

- Refereed journal papers: 10
- Refereed conference papers: 35
- Number of citations (according to Google Scholar): 1352
- H-index (according to Google Scholar): 19

Service in peer review

Grant proposals	– US National Science Foundation, (NSF), Information and Intelligent Systems. – Netherlands Organisation for Scientific Research, (NWO), Physical Sciences.
Journals	– Audio, Speech, and Language Processing, IEEE Transactions on – Audio, Speech, and Music Processing, EURASIP Journal on, Hindawi – Bernoulli Society for Mathematical Statistics and Probability, Journal of the – Computational Intelligence and Neuroscience, Hindawi – Chemometrics and Intelligent Laboratory Systems, Elsevier – Image Processing, IEEE Transactions on – Information Fusion, Elsevier – Neurocomputing, Elsevier – Pattern Recognition, Elsevier

– Pattern Analysis and Machine Intelligence, IEEE Transactions on
– Signal Processing, EURASIP, Elsevier
– Signal Processing, EURASIP Journal of advances in, Hindawi
– Signal Processing, IEEE Transactions on
– Signal Processing Letters, IEEE
– Signal Processing Systems, Journal of
– Technometrics, Taylor & Francis

Conferences

– Acoustics, Speech, and Signal Processing (ICASSP), IEEE Intl. Conf. on
– Artificial Neural Networks (ICANN), Intl. Conf. on
– Circuits and Systems (ISCAS), IEEE Intl. Symposium on
– Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), IEEE
– European Signal Processing Conference (EUSIPCO), EURASIP
– Independent Component Analysis and Signal Separation, Intl. Conf. on
– Machine Learning (ICML), Intl. Conf. on
– Music Information Retrieval (ISMIR), Intl. Conf. on
– Neural Information Processing Systems (NIPS), Conf. on
– Statistical And Perceptual Audition (SAPA)

Personal References

– Professor Zoubin Ghahramani CBL, Department of Engineering, University of Cambridge, UK.
– Professor Lars Kai Hansen DTU Informatics, Technical University of Denmark.
– Associate Professor Jan Larsen DTU Informatics, Technical University of Denmark .
– Professor Dan P. W. Ellis LabROSA, Columbia University , New York, USA.

List of publications

Refereed journal publications

[1] Fumiko K. Glückstad, Mikkel N. Schmidt, and Morten Mørup. "Examination of Heterogeneous Societies: Identifying subpopulations by contrasting cultures". In: *Journal of Cross-Cultural Psychology* 48.1 (2017). DOI: doi:10.1177/0022022116672346.

[2] Kasper B. Frøhling, Tommy S. Alstrøm, Michael Bache, Michael S. Schmidt, Mikkel N. Schmidt, Jan larsen, Mogens H. Jakobsen, and Anja Boisen. "Surface-enhanced Raman spectroscopic study of DNA and 6-mercapto-1-hexanol interactions using large area mapping". In: *Vibrational Spectroscopy* 86 (Sept. 2016), pp. 331–336. DOI: doi:10.1016/j.vibspec.2016.08.005.

[3] Kasper Winther Andersen, Kristoffer H. Madsen, Hartwig Roman Siebner, Mikkel N. Schmidt, Morten Mørup, and Lars Kai Hansen. "Non-parametric Bayesian graph models reveal community structure in resting state fMRI". In: *NeuroImage* (2014), pp. 301–15. DOI: 10.1016/j.neuroimage.2014.05.083.

[4] Fumiko K. Glückstad, Tue Herlau, Mikkel N. Schmidt, and Morten Mørup. "Cross-categorization of legal concepts across boundaries of legal systems". In: *Artificial Intelligence and Law* (2014). DOI: 10.1007/s10506-013-9150-2.

[5] Tue Herlau, Mikkel N. Schmidt, and Morten Mørup. "Infinite-degree-corrected stochastic block model". In: *Physical Review E* 90.032819 (2014). DOI: 10.1103/PhysRevE.90.032819.

[6] Mikkel N. Schmidt and Morten Mørup. "Non-parametric Bayesian modeling of complex networks. An introduction". In: *IEEE Signal Processing Magazine* 30.3 (May 2013), pp. 110–128. DOI: 10.1109/MSP.2012.2235191.

[7] Darko Zibar, Ole Winther, Niccolo Franceschi, Robert Borkowski, Antonio Caballero, Valeria Arlunno, Mikkel N. Schmidt, Neil Guerrero Gonzales, Bangning Mao, Yabin Ye, Knud J. Larsen, and Idelfonso Tafur Monroy. "Nonlinear impairment compensation using expectation maximization for dispersion managed and unmanaged PDM 16-QAM transmission". In: *Optics Express* 20.26 (2013), B181–B196. DOI: 10.1364/OE.20.00B181.

[8] Morten Mørup and Mikkel N. Schmidt. "Bayesian community detection". In: *Neural Computation* 24.9 (2012), pp. 2434–56. DOI: 10.1162/NECO_a_00314.

[9] Morten Arngren, Mikkel N. Schmidt, and Jan Larsen. "Unmixing of hyperspectral images using Bayesian nonnegative matrix factorization with volume prior". In: *Journal of Signal Processing Systems* 65.3 (2010), pp. 479–496. DOI: 10.1007/s11265-010-0533-2.

[10] Mikkel N. Schmidt and Hans Laurberg. "Non-negative matrix factorization with Gaussian process priors". In: *Computational Intelligence and Neuroscience* (2008). DOI: 10.1155/\/2008/361705.

Refereed conference publications

[11] Tommy S. Alstrøm, Mikkel N. Schmidt, Tomas Rindzevicius, Anja Boisen, and Jan Larsen. "A pseudo-Voigt component model for high-resolution recovery of constituent spectra in raman spectroscopy". In: *Acoustics, speech and signal processing, IEEE international conference on (ICASSP)*. 2017.

[12] Kristoffer J. Albers, Morten Mørup, and Mikkel N. Schmidt. "The influence of hyper-parameters in the infinite relational model". In: *Machine Learning for Signal Processing, IEEE International Workshop on, (MLSP)*. 2016.

[13] Tue Herlau, Mikkel N. Schmidt, and Morten Mørup. "Completely random measures for modelling block-structured sparse networks". In: *Advances in neural information processing (NIPS)*. 2016.

[14] Philip H. Jørgensen, Morten Mørup, Mikkel N. Schmidt, and Tue Herlau. "Bayesian latent feature modeling for modeling bipartite networks with overlapping groups". In: *Machine Learning for Signal Processing, IEEE International Workshop on, (MLSP)*. 2016.

[15] Rasmus E. Røge, Kristoffer H. Madsen, Mikkel N. Schmidt, and Morten Mørup. "Unsupervised segmentation of task activated regions in FMRI". In: *Machine Learning for Signal Processing, IEEE International Workshop on, (MLSP)*. 2015.

[16] Mikkel N. Schmidt and Kristoffer Jon Albers. "Numerical approximations for speeding up MCMC inference in the infinite relational model". In: *European Signal Processing Conference (EUSIPCO)*. 2015.

[17] Tommy S. Alstrøm, Kasper B. Frøhling, Jan Larsen, Mikkel N. Schmidt, Michael Bache, Michael S. Schmidt, Mogens H. Jakobsen, and Anja Boisen. "Improving the Robustness of Surface Enhanced Raman Spectroscopy based Sensors by Bayesian Non-negative Matrix Factorization". In: *Machine Learning for Signal Processing, IEEE International Workshop on, (MLSP)*. 2014.

[18] Karen Sandø Ambrosen, Kristoffer Jon Albers, Tim Dyrby, Mikkel N. Schmidt, and Morten Mørup. "Nonparametric Bayesian Clustering of Structural Whole Brain Connectivity in Full Resolution". In: *Pattern Recognition in NeuroImaging (PRNI)*. 2014. DOI: 10.1109/PRNI.2014.6858507.

[19] Morten Mørup, Fumiko K. Glückstad, Tue Herlau, and Mikkel N. Schmidt. "Nonparametric Statistical Structuring of Knowledge Systems using Binary Feature Matches". In: *Machine Learning for Signal Processing, IEEE International Workshop on, (MLSP)*. 2014.

[20] Mikkel N. Schmidt, Tue Herlau, and Morten Mørup. "Discovering hierarchical structure in normal relational data". In: *Cognitive Information Processing (CIP)*. 2014. DOI: 10.1109/CIP.2014.6844498.

[21] Kristoffer Jon Albers, Andreas Leon Aagaard Moth, Morten Mørup, and Mikkel N. Schmidt. "Large scale inference in the infinite relational model: Gibbs sampling is not enough". In: *Machine Learning for Signal Processing, IEEE International Workshop on (MLSP)*. 2013. DOI: 10.1109/MLSP.2013.6661904.

[22] Karen Sandø Ambrosen, Tue Herlau, Tim Dyrby, Mikkel N. Schmidt, and Morten Mørup. "Comparing Structural Brain Connectivity by the Infinite Relational Model". In: *Pattern Recognition in NeuroImaging (PRNI)*. 2013, pp. 50–53. DOI: 10.1109/PRNI.2013.22.

[23] Fumiko K. Glückstad, Tue Herlau, Mikkel N. Schmidt, and Morten Mørup. "Analysis of Conceptualization Patterns across Groups of People". In: *Technologies and Applications of Artificial Intelligence, Conference on (TAAI)*. 2013. DOI: 10.1109/TAAI.2013.75.

[24] Fumiko K. Glückstad, Tue Herlau, Mikkel N. Schmidt, and Morten Mørup. "Analysis of Subjective Conceptualizations Towards Collective Conceptual Modelling". In: *Japanese Society for Artificial Intelligence, Conference of the (JSAI)*. 2013.

[25] Fumiko K. Glückstad, Tue Herlau, Mikkel N. Schmidt, and Morten Mørup. "Unsupervised Knowledge Structuring: Application of Infinite Relational Models to the FCA Visualization". In: *Signal Image Technology and Internet based Systems, International Conference on (SITIS)*. 2013, pp. 233–40. DOI: 10.1109/SITIS.2013.48.

[26] Tue Herlau, Morten Mørup, and Mikkel N. Schmidt. "Modeling Temporal Evolution and Multiscale Structure in Networks", Machine Learning, International Conference on (ICML)". In: 2013.

[27] Tommy S. Alstrøm, Bjørn S. Jensen, Mikkel N. Schmidt, Natalie V. Kostesha, and Jan Larsen. "Haussdorff and Hellinger for colorimetric sensor array classification". In: *Machine Learning for Signal Processing, IEEE International Workshop on (MLSP)*. 2012. DOI: 10.1109/MLSP.2012.6349724.

[28] Tue Herlau, Morten Mørup, Mikkel N. Schmidt, and Lars Kai Hansen. "Detecting hierarchical structure in networks". In: *Cognitive Information Processing (CIP)*. 2012. DOI: 10.1109/CIP.2012.6232913.

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[30] Mikkel N. Schmidt, Stephen Schwartz, and Jan Larsen. "Interactive 3D audio: Enhancing awareness of details in immersive soundscapes?" In: *133rd Convention of the Audio Engineering Society*. 2012.

[31] Darko Zibar, Ole Winther, iccolo Franceschi, Robert Borkowski, tonio Caballero, Mikkel N. Schmidt Valeria Arlunno, eil Guerrero Gonzales, Bangning Mao, Knud J. Larsen, and Idelfonso Tafur Monroy. "Nonlinear Impairment Compensation Using Expectation Maximization for PDM 16-QAM Systems". In: *European Conference on Optical Communications (ECOC)*. 2012. DOI: 10.1364/OE.20.00B18.

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[34] Mikkel N. Schmidt and Morten Mørup. "Infinite non-negative matrix factorization". In: *European Signal Processing Conference (EUSIPCO)*. 2010.

[35] Morten Arngren, Mikkel N. Schmidt, and Jan Larsen. "Bayesian nonnegative matrix factorization with volume prior for unmixing of hyperspectral images". In: *Machine Learning for Signal Processing, IEEE Workshop on (MLSP)*. 2009. DOI: 10.1109/MLSP.2009.5306262.

[36] Mikkel N. Schmidt. "Function factorization using warped Gaussian processes". In: *Machine Learning, International Conference on (ICML)*. 2009.

[37] Mikkel N. Schmidt. "Linearly constrained matrix factorization for blind source separation". In: *Advances in neural information processing (NIPS)*. 2009.

[38] Mikkel N. Schmidt and Shakir Mohamed. "Probabilistic non-negative tensor factorization using Markov chain Monte Carlo". In: *European Signal Processing Conference (EUSIPCO)*. 2009.

[39] Mikkel N. Schmidt, Ole Winther, and Lars Kai Hansen. "Bayesian non-negative matrix factorization". In: *Independent Component Analysis and Signal Separation, International Conference on (ICA), Springer Lecture Notes in Computer Science, Vol. 5441*. 2009, pp. 540–547.

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[43] Mikkel N. Schmidt and Rasmus K. Olsson. "Linear Regression on Sparse Features for Single-Channel Speech Separation". In: *Applications of Signal Processing to Audio and Acoustics, IEEE Workshop on (WASPAA)*. 2007, pp. 26–29. DOI: 10.1109/ASPAA.2007.4393010.

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