

Curriculum vitae January 2009

Ole Winther

Born, December 18 1967. Danish citizen.

Spouse, Cand. Scient. Ph.D., Mette M-L Grage. Born, May 9 1968.

Daughter, Rebecca Grage Winther. Born, March 23 1996.

Son, Thor Alexander Grage Winther. Born, July 14 1999.

Son, Valdemar Albert Grage Winther. Born, September 4 2004.

Coordinates

Work address 1: IMM, DTU, B321, DK-2800 Lyngby, DK.

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Current Positions

- January 2006 to present, Associate Professor, Intelligent Signal Processing, Informatics and Mathematical Modelling, Technical University of Denmark (DTU), halftime and
- January 2006 to present, Group Leader, Promoter Analysis, Bioinformatics, University of Copenhagen (KU), halftime.

Previous Positions

- November 2001 to December 2005, Associate Professor, Intelligent Signal Processing, Informatics and Mathematical Modelling (IMM), DTU.
- November 2000 – October 2001, Assistant Research Professor, Center for Biological Sequence Analysis, BioCentrum, DTU, under Søren Brunak and Anders Krogh.
- August 2000 – October 2000, Assistant Research Professor, Digital Signal Processing, IMM, DTU, under Lars Kai Hansen.
- May 1998 – July 2000, Postdoctoral Fellow, Complex Systems Group, Theoretical Physics II, Lund University, under Carsten Peterson.
- April 96, November 96 – March 97, paternal leave and June – November 95, military service.

Education

- May 1998, Ph.D., physics, KU. Ph.D.-thesis: *Bayesian Mean Field Algorithms for Neural Networks and Gaussian Processes*, supervisor Benny Lautrup.
- March 94, Cand. Scient. Physics and Bachelor Computer Science, KU. Master thesis in physics: *Theory and Application of Feed-Forward Neural Networks*, supervisors Benny Lautrup, Sara A. Solla and David Sherrington.
- Studies, April 94 – April 98, Ph.D. physics; September 86 – February 94, Cand. Scient. physics; September 88 – January 92, Bachelor Computer Science, all KU.

Managerial activities:

- January 2006 – present, Group Leader, Promoter Analysis, Bioinformatics, KU.

Key research topics:

- Machine learning (substantial impact) and recently bioinformatics.

PhD Supervision:

- 3 graduated, 1 about to defend thesis, 5 current (3 co-supervised).

Publications:

- 26 peer reviewed journal papers,
- 15 printed contributions to peer reviewed conference proceedings (12) and peer reviewed book chapter (1) and
- 9 other publications (7 printed contributions in reviewed conference proceedings and 2 unreviewed book chapters).

Other activities:

- 10+ supervised master projects; taught 10+ master- and PhD-level courses in signal processing, machine learning and bioinformatics; 30+ talks, invited talks and poster presentations; reviewed for 25+ journals and conferences; 10+ chairman/opponent/assessment committee PhD defences; 2 industrial consultancies; co-founder Faraos Cigarer A/S and longer visits Oxford, UCSC, Lund and Cambridge.

Ole Winther Publications November 2007

The most important papers are marked with (*). Most of the papers and additional material may be obtained from my homepage. Papers are sorted into peer reviewed journal, peer reviewed conference and reviewed conference papers.

Peer reviewed journal papers

1. E. Valen, G. Pascarella, A. Chalk, N. Maeda, M. Kojima, C. Kawazu, M. Murata, H. Mishiyori, D. Lazarevich, D. Motti, T. T. Marstrand, M-H. E. Tang, X. Zhao, A. Krogh, O. Winther, T. Arakawa, J. Kawai, C. Wells, C. Daub, M. Harbers, Y. Hayashizaki, S. Gustincich, A. Sandelin and P. Carninci, *Genome-wide detection and analysis of hippocampus core promoters using DeepCAGE*, Genome Res. (2008).
2. M-H. E. Tang, A. Krogh and O. Winther, *BayesMD: flexible biological modeling for motif discovery*, J Comput Biol. **15**, 1347-63 (2008).
3. J. C. Bryne, E. Valen, M-H. E. Tang, T. Marstrand, O. Winther, I. da Piedade, A. Krogh, B. Lenhard and A. Sandelin *JASPAR, the open access database of transcription factor binding profiles: New content and tools in the 2008 update*, Nuclear Acid Research **36**, D102-D106 (2008). 5 pages.
4. T. Beierholm and O. Winther, *Particle Filter Inference in an Articulatory Based Speech Model*, IEEE Signal Processing Letters **14**, 883-886 (2007).
5. O. Winther and K. B. Petersen, *Flexible and Efficient Implementations of Bayesian Independent Component Analysis*, Neurocomputing, **71**, 221-233 (2007).
6. O. Winther and K. B. Petersen, *Bayesian Independent Component Analysis: Variational Methods and Non-negative Decompositions*, Digital Signal Processing, **17**, 858-872 (2007).
7. B. Regenber, T. Grotkjær, O. Winther, A. Fausbøll, M. Åkesson, C. Bro, L. K. Hansen, S. Brunak and J. Nielsen, *Growth-rate regulated genes have profound impact on interpretation of transcriptome profiling in Saccharomyces cerevisiae*, Genome Biology **7**, R107 (2006). (*)
8. T. Grotkjær, O. Winther, B. Regenber, J. Nielsen and L. K. Hansen, *Robust Multi-scale Clustering of Large DNA Microarray Datasets with the Consensus Algorithm*, Bioinformatics **22** 58-67 (2006). (*)
9. T. Heskes, M. Opper, W. Wiegerinck, O. Winther and O. Zoeter, *Approximate Inference Techniques with Expectation Constraints*, Journal of Statistical Mechanics: Theory and Experiment, P11015 (2005).
10. M. Opper and O. Winther, *Expectation Consistent Approximate Inference*, Journal of Machine Learning Research, **6** 2177-2204 (2005). (*)

11. K. B. Petersen, O. Winther and L. K. Hansen, *On the Slow Convergence of EM and VBEM in Low-Noise Linear Models*, *Neural Computation* **17** 1921–1926 (2005).
12. M. Opper and O. Winther, *Approximate Inference in Probabilistic Models*, *Lecture Notes in Artificial Intelligence* **3244**, 494–504 (2004).
13. O. Winther and A. Krogh, *Teaching computers to fold proteins*, *Phys. Rev. E* **70** 030903 (2004), 4 pages. (*)
14. L. Csato, M. Opper and O. Winther, *Tractable Inference for Probabilistic Data Models*, *Complexity* **8** 64–68 (2003).
15. P.A.d.F.R. Højen-Sørensen, O. Winther and L. K. Hansen, *Analysis of Functional Neuroimages using ICA Adaptive Binary Sources*, *Neurocomputing* **49**, 213–225 (2002).
16. P.A.d.F.R. Højen-Sørensen, O. Winther, and L. K. Hansen, *Mean Field Approaches to Independent Component Analysis*, *Neural Computation* **14**, 889–918 (2002). (*)
17. M. Opper and O. Winther, *Adaptive and Self-averaging Thouless-Anderson-Palmer Mean Field Theory for Probabilistic Modeling*, *Physical Review E* 056131 (2001). 14 pages. (*)
18. M. Opper and O. Winther, *Probabilistic Data Modeling with Adaptive TAP Mean Field Theory*, *Physica A* **302** (1-4), 119–125 (2001). 7 pages.
19. M. Opper and O. Winther, *Tractable Approximations for Probabilistic Models: The Adaptive Thouless-Anderson-Palmer Approach*, *Phys. Rev. Lett.* **86**, 3695–3698 (2001). 4 pages. (*)
20. M. Opper and O. Winther, *Gaussian Processes for Classification: Mean Field Algorithms*, *Neural Computation* **12** 2655–2684 (2000). 30 pages. (*)
21. S. A. Solla and O. Winther, *Optimal Online Learning: a Bayesian Approach*, *Computer Physics Communication*, **121-122**, 94–97 (1999). 4 pages
22. O. Winther, B. Lautrup, and J.-B. Zhang, *Optimal Learning in Multilayer Neural Networks*, *Physical Review E* **55**, 836–844 (1997). 9 pages.
23. M. Opper and O. Winther, *Mean Field Approach to Bayes Learning in Feed-Forward Neural Networks*, *Phys. Rev. Lett.* **76**, 1964–1967 (1996). 4 pages. (*)
24. D. O’Kane and O. Winther, *Learning to Classify in Large Committee Machines*, *Phys. Rev. E* **50**, 3201–3209 (1994). 9 pages.
25. J. Gorodkin, A. Sørensen and O. Winther, *Neural Networks and Cellular Automata Complexity*, *Complex Systems* **7**, 1–23, (1993). 23 pages.

26. J. Gorodkin, A. Krogh, L. K. Hansen, C. Svarer and O. Winther, *A Quantitative Study of Pruning by Optimal Brain Damage*, Int. Jour. of Neural Systems. **4** 159-169, (1993). 11 pages.

Printed contributions to peer reviewed conference proceedings

1. M. Opper, U. Paquet and O. Winther, *Improving on Expectation Propagation*, In Advances in Neural Information Processing Systems 22 (NIPS'2008), (2009).
2. M. Hansen, L. P. B. Christensen and O. Winther, *On Sphere Detection and Minimum-phase Prefiltered Reduced-State Sequence Estimation*, Proceeding of IEEE Globecom (2007).
3. F. Wang, S. Wang, C. Zhang and O. Winther *Semi-Supervised Mean Fields*, Proceedings of the Eleventh International Conference on Artificial Intelligence and Statistics, AISTATS (2007).
4. M. Opper and O. Winther, *Expectation Consistent Free Energies for Approximate Inference*, In Advances in Neural Information Processing Systems 17 (NIPS'2004), (2004). 8 pages.
5. M. Opper and O. Winther, *Variational Linear Response*, In Advances in Neural Information Processing Systems 16 (NIPS'2003), (2004). 8 pages.
6. J. Quiñonero Candela and O. Winther, *Incremental Gaussian Processes*, In Advances in Neural Information Processing Systems 15 (NIPS'2002), S. Becker, S. Thrun, and K. Obermayer (eds.), MIT Press (2003). 8 pages.
7. L. Csato, M. Opper and O. Winther, *TAP Gibbs Free Energy, Belief Propagation and Sparsity*, In Advances in Neural Information Processing Systems 14 (NIPS'2001), T. G. Dietterich, S. Becker and Z. Ghahramani, eds., MIT Press (2002). 8 pages.
8. O. Winther, *Computing with Finite and Infinite Networks*, in Advances in Neural Information Processing Systems 13 (NIPS'2000), eds. T. K. Leen, T. G. Diettrich, and V. Tresp, (NIPS'2000), MIT Press (2001). 7 pages. (*)
9. P.A.d.F.R. Højen-Sørensen, O. Winther, and L. K. Hansen, *Ensemble Learning and Linear Response Theory for ICA*, in Advances in Neural Information Processing Systems 13 (NIPS'2000), eds. T. K. Leen, T. G. Diettrich, and V. Tresp, MIT Press (2001). 7 pages.
10. L. Csató, E. Fokoué, M. Opper, B. Schottky and O. Winther, *Efficient Approaches to Gaussian Process Classification*, in Advances in Neural Information Processing Systems 12 (NIPS'99), eds. S. A. Solla, T. K. Leen, and K.-R. Müller, 251-257, MIT Press (2000). 7 pages.

11. M. Opper and O. Winther, *Gaussian Processes and SVM: Mean Field Results and Leave-One-Out*, in Advances in Large Margin Classifiers, eds. A. J. Smola, P. Bartlett, B. Schölkopf, D. Schuurmans, 311-326, MIT Press (2000). 16 pages.
12. M. Opper and O. Winther, *Mean Field Methods for Classification with Gaussian Processes*, in Advances in Neural Information Processing Systems 11 (NIPS'98), eds. M. S. Kearns, S. A. Solla, and D. A. Cohn, 309-315, MIT Press (1999). 7 pages.
13. O. Winther and S. A. Solla, *Optimal Bayesian Online Learning*, in Theoretical Aspects of Neural Computing 97 (TANC'97), eds. K.Y. M. Wong, I. King, and D.Y. Yeung, 61-70, Springer Singapore (1998). 10 pages.
14. M. Opper and O. Winther, *A Mean Field Algorithm for Bayes Learning in Large Feed-Forward Neural Networks*, in Advances in Neural Information Processing Systems 9 (NIPS'96), eds. M. C. Mozer, M. I. Jordan, and T. Petsche, 225-331, MIT Press (1997). 7 pages.
15. S. Halkjær and O. Winther, *The Effect of Correlated Input Data on the Dynamics of Learning*, in Advances in Neural Information Processing Systems 9 (NIPS'96), eds. M. C. Mozer, M. I. Jordan, and T. Petsche, 169-175, MIT Press (1997). 7 pages

Other publications (printed contributions to reviewed conference proceedings)

1. K. B. Petersen and O. Winther, *The EM Algorithm in Independent Component Analysis*, ICASSP (2005). 4 pages.
2. T. Beierholm, B. D. Pedersen and O. Winther, *Low Complexity Bayesian Single Channel Source Separation*, ICASPP (2004). 4 pages.
3. T. Fabricius and O. Winther, *Improved Multistage Detector by Mean-Field Annealing in Multi-User CDMA*, in Proceedings of IEEE Intelligent Signal Processing, Applications, and Communication Systems (2002). 5 pages.
4. T. Kolenda, L. K. Hansen, J. Larsen and O. Winther, *Independent Component Analysis for Understanding Multimedia Content*, in Proceedings of IEEE Workshop on Neural Networks for Signal Processing XII, H. Bourlard, T. Adali, S. Bengio, J. Larsen, and S. Douglas (eds.), IEEE Press (2002). 10 pages.
5. P.A.d.F.R. Højen-Sørensen, L. K. Hansen and O. Winther, *Mean Field Implementation of Bayesian ICA*, In proceedings of 3rd International Conference on Independent Component Analysis and Blind Signal Separation (ICA2001), Institute of Neural Computation (2001). 6 pages.
6. M. Opper and O. Winther, *From Naive Mean Field Theory to the TAP Equations*, in Advanced Mean Field Methods - Theory and Practice, eds. M. Opper and D. Saad, 7-20, MIT Press (2001). 14 pages.

7. M. Opper and O. Winther, *Adaptive TAP Equations*, in *Advanced Mean Field Methods - Theory and Practice*, eds. M. Opper and D. Saad, 85-98, MIT Press (2001). 14 pages.
8. S. A. Solla and O. Winther, *Optimal perceptron learning: an online Bayesian approach*, in *Proceedings of the Newton Institute Workshop on On-Line Learning*, ed. D. Saad, 379-398, Cambridge University Press (1998). 20 pages. (*)
9. O. Winther and S. A. Solla, *Bayesian Online Learning in the Perceptron*, in *European Symposium on Artificial Neural Networks (ESANN'97)*, ed. M. Verleysen, 167-172, D Facto, Brussels (1997). 6 pages.