Curriculum Vitae - Aree Widya Witoelar, Ph.D.

CONTACT INFORMATION

Norwegian Centre for Mental Disorders Research (NORMENT)
Institute for Clinical Medicine
University of Oslo / Oslo University Hospital
Ullevål Hospital, building 49
P.O. Box 4956 Nydalen
0424 Oslo
Norway

Voice: +47 2301 6277
Fax: +47 2302 7333
Mobile: +47 4824 8813
E-mail: aree.witoelar@medisin.uio.no
WWW: http://www.witoelar.com/aree

EXPERTISE

· **Machine learning**: high-dimensional analysis, classification/clustering, feature selection
· **Statistical physics for inference**: inverse Ising problems, network reconstruction
· **Computational neuroscience**: grid cells, neural network modelling
· **Statistical genetics**: genome-wide association study, empirical Bayes methods

ACADEMIC POSITIONS

Senior Postdoctoral Researcher in Statistical Genetics, 2014-current
Norwegian Centre for Mental Disorders Research (NORMENT), Institute for Clinical Medicine
University of Oslo / Oslo University Hospital, Norway

Postdoctoral Researcher in Computational Neuroscience, 2010-2014
Kavli Institute for Systems Neuroscience / Center for Neural Computation
Norwegian University of Science and Technology (NTNU), Trondheim, Norway

EDUCATION

· **Ph.D. in Machine Learning**, 2005-2010, University of Groningen, the Netherlands
· **M.Sc. in Physics**, 2002-2005, University of Groningen, the Netherlands
· **B.Sc. in Engineering Physics**, 1996-2002, Bandung Institute of Technology (ITB), Indonesia

PUBLICATIONS

R.S. Desikan, A.J. Schork, Y. Wang, W.K. Thompson, A. Dehghan, P.M. Ridker, D.I. Chasman, L.K. McEvoy, D. Holland, C-H. Chen, D.S. Karow, J.B. Brewer, C.P. Hess, J. Williams, R. Sims, M.C. O'Donovan, S.H. Choi, J.C. Bis, M.A. Ikram, V. Gudnason, A.L. DeStefano, S.J. van der Lee, B.M. Psaty, C.M. van Duijn, L. Launer, S. Seshadri, M.A. Pericak-Vance, R. Mayeux, J.L. Haines, L.A. Farrer, J. Hardy, I.D. Ulstein, D. Aarsland, T. Fladby, L.R. White, S.B. Sando, A. Rongve, A. Witoelar, S. Djurovic, B.T. Hyman, J. Snaedal, S. Steinberg, H. Stefansson, K. Stefansson, G.D. Schellenberg, O.A. Andreassen, and A.M. Dale. Polygenic Overlap Between C-Reactive Protein, Plasma Lipids and Alzheimer's Disease. *Circulation*. 2015. doi:10.1161/CIRCULATIONAHA.115.015489

R.S. Desikan, A.J. Schork, Y. Wang, A. Witoelar, M. Sharma, L.K. McEvoy, D. Holland, J.B. Brewer, C.-H. Chen, W.K. Thompson, D. Harold, J. Williams, M.J. Owen, M.C. O'Donovan, M.A. Pericak-Vance, R. Mayeux, J.L. Haines, L.A. Farrer, G.D. Schellenberg, P. Heutink, A.B. Singleton, A. Brice, N.W. Wood, J. Hardy, M. Martinez, S.H. Choi, A. DeStefano, M.A. Ikram, J. C. Bis, A. Smith, A.L. Fitzpatrick, L. Launer, C. van Duijn, S. Seshadri, I.D. Ulstein, D. Aarsland, T. Fladby, S. Djurovic, B.T. Hyman, J. Snaedal, H. Stefansson, K. Stefansson, T. Gasser, O.A. Andreassen and A.M. Dale. Genetic overlap between Alzheimer's disease and Parkinson's disease at the MAPT locus. *Molecular Psychiatry*. 2015. doi: 10.1038/mp.2015.6.

J.J. Couey, A. Witoelar, S.-J. Zhang, K. Zheng, J. Ye, B. Dunn, R. Czajkowski, M.-B. Moser, E.I. Moser, Y. Roudi and M.P. Witter. Recurrent inhibitory circuitry as a mechanism for grid formation. *Nature Neuroscience* 16, p. 318-328, 2013. doi:10.1038/nn.3310 *(shared first authorship)*

A. Witoelar, G.J. de Vries, A. Ghosh, B. Hammer and M. Biehl, Window-based example selection of learning vector quantization, *Neural Computation*, Vol. 22, No. 11, p. 2924-2961, 2010. doi: 10.1162/NECO_a_00030

A. Witoelar and M. Biehl, Phase transitions in Vector Quantization and Neural Gas, *Neurocomputing* 72, p. 1390-1397, 2009. doi: 10.1016/j.neucom.2008.10.023

A. Witoelar, M. Biehl, A. Ghosh and B. Hammer, Learning Dynamics of Neural Gas and Vector Quantization. *Neurocomputing* 71, p. 1210-1219, 2008. doi:10.1016/j.neucom.2007.11.022

Articles in preparation

Y. Wang, W.K. Thompson, A.J. Schork, D. Holland, C.-H. Chen, F. Bettella, R.S. Desikan, W. Li, A. Witoelar, A. Devor, Bipolar Disorder and Schizophrenia Working Group of the PGC, M.M. Nothen, M. Rietschel, Q. Chen, T. Werge, S. Cichon, D.R. Weinberger, S. Djurovic, M. O'Donovan, O.A. Andreassen and A.M. Dale. Leveraging genomic annotations and pleiotropic enrichment for improved replication rates in schizophrenia GWAS. Under review.

W.K. Thompson, Y. Wang, A. Schork, V. Zuber, O.A. Andreassen, A.M. Dale. Empirical Bayes method for estimating the distribution of effects in genome-wide association studies. Under review.

L. Pihlstrøm, A. Witoelar, R.S. Desikan, Y. Wang, S. Djurovic, W.K. Thompson, A.J. Schork, L.K. McEvoy, P. Heutink, A. Brice, N.W. Wood, M. Martinez, J. Hardy, A.B. Singleton, M. Sharma, T. Gasser, M. Toft, A.M. Dale, O.A. Andreassen. Genetic pleiotropy with common phenotypes identifies multiple new risk loci for Parkinson's disease. Submitted.

M. Sharma, A. Witoelar, Y. Wang, R.S. Desikan, W.K. Thompson, A.J. Schork, V. Zuber, E. Ellinghaus, A. Franke, B.A. Lie, L.K. McEvoy, T.H. Karlsen, IPDGC, A. Singleton, S. Djurovic, A.M. Dale, T. Gasser, O.A. Andreassen. Genome wide pleiotropic study in 144,701 subjects reveals shared genetic variants between Parkinson′s disease and immune-mediated diseases. In preparation.

A. Witoelar, M. Tesli, Y. Wang, R.S. Desikan, W.K. Thompson, M.. Toft, A.J. Schork, P. Svenningsson, M. Sharma, T. Gasser, V. Zuber, L.K. McEvoy, E. Jonsson, M. O'Donovan, T. Werge, S. Djurovic, A.M. Dale, O.A. Andreassen. Polygenetic pleiotropy between schizophrenia and Parkinson's disease. In preparation.

Proceedings

A. Witoelar and Y. Roudi. Neural network reconstruction using kinetic Ising models with memory. BMC Neuroscience 2011, 12(Suppl 1):P274.

A. Witoelar, M. Biehl and B. Hammer. Equilibrium properties of offline LVQ. In M. Verleysen, editor, *Proc. Of European Symposium on Neural Networks (ESANN)* 2009, d-side, Evere, Belgium, 535-540, 2009.

A. Witoelar, A. Ghosh and M. Biehl. Phase transitions in Vector Quantization. In M. Verleysen, editor, *Proc. Of European Symposium on Neural Networks (ESANN)* 2008, d-side, Evere, Belgium, 221-226, 2008.

A. Witoelar, M. Biehl and B. Hammer. Learning Vector Quantization: generalization ability and dynamics of competing prototypes. In *Proc. of 6th Int. Workshop on Self-Organizing Maps (WSOM)*, Bielefeld, 2007.

A. Witoelar, M. Biehl, A. Ghosh and B. Hammer. On the Dynamics of Vector Quantization and Neural Gas. In M. Verleysen, editor, *Proc. of European Symposium on Neural Networks (ESANN)* 2007, d-side, Evere, Belgium, 127-132, 2007.

Selected Posters

S. Srinivasan, F. Bettella, M. Mattingsdal, A. Witoelar, R.S. Desikan, A.J. Schork, W.K. Thompson, V. Zuber, Y. Wang, A.M. Dale, S. Djurovic, O.A. Andreassen. Genomic regions involved in human evolution are enriched of associations with schizophrenia. WCPG 2014, Copenhagen, Denmark.

V. Zuber, M. De Biasi, A. Witoelar, Y. Wang, F. Bettella, A.J. Schork, W.K. Thompson, PGC SCZ

Working Group, C.M. Ulrich, R.J. Hung, L. Le Marchand, C. Amos, A.M. Dale, S. Djurovic, I.G. Mills, O.A. Andreassen. Shared common variants in schizophrenia and lung cancer. WCPG 2014, Copenhagen, Denmark.

B. Dunn, A. Witoelar, J.J. Couey, T. Bonnevie, M.-B. Moser, E.I. Moser, M.P. Witter and Y. Roudi. An inhibitory network of grid cells. Society for Neuroscience 2012.

J.J. Couey, A. Witoelar, S.-J. Zhang, R. Czajkowski, B. Dunn, J. Ye, M.-B. Moser, E.I. Moser, Y. Roudi, M.P. Witter. Medial entorhinal cortex layer II stellate cells are embedded within a recurrent inhibitory network. Society for Neuroscience 2012.

B. Dunn, A. Witoelar, J.J. Couey, M.-B. Moser, E.I. Moser, M.P. Witter and Y. Roudi. Grid Cells emerge from a competitive network. 8th FENS Forum of Neuroscience, 2012

A. Witoelar, M. Biehl and B. Hammer. Equilibrium properties of offline Learning Vector Quantization. Scientific ICT Research Event Netherlands (SIREN), Enschede, the Netherlands, 2009.

A. Witoelar, M. Biehl and A. Ghosh. Dynamics of Multiple Prototype LVQ. Scientific ICT Research Event Netherlands (SIREN), Utrecht, the Netherlands, 2006.

M. Biehl, A. Ghosh and A. Witoelar. Learning from examples in Neural Gas and Vector Quantization, DPG Frhjahrstagung, Dresden, Germany, 2006.

Other

· **Reviewer** for *American Journal of Human Genetics*, *Human Molecular Genetics*, *PLOS Genetics*, *New Journal of Physics*, *Neurocomputing*, *IEEE Transactions on Neural Networks*, *Neural Processing Letters*, *Journal of the Royal Society Interface*, *Frontiers in Neural Circuits*, *Computational Neuroscience* and *Neuroscience & Biobehavioral Reviews*.

· **Lecturer** for Computational Neuroscience, Neural Networks, Linear Algebra

· **Teaching Assistant** for Digital Systems, Electronics, Scientific Measurement

Awards and Grants

· NORDITA grant, Workshop on Non-Equilibrium Statistical Mechanics, Stockholm, 2011 and 2013.
· NORDITA grant, Biology and Physics of Information Processing, Stockholm, 2012
· Travel grant from KITP-China, Statistical Physics & Complex Networks, Beijing, 2011
· Support from IDIAP, IDIAP 15th Workshop, Martigny, 2006
· Awarded for an Ubbo Emmius scholarship from University of Groningen, 2005
· Graduated Met Veel Genoegen (with great honors), MSc. in Physics, University of Groningen, 2005

Schools

· King's College London (KCL) Summer Course 2015 Psychiatric Genomics Consortium Analyst Training Course. London, June 2015.
· Int'l Centre for Theoretical Physics (ICTP) School on Large Scale Problems in Machine Learning. Trieste, August 2012.
· Bernstein Center for Computational Neuroscience (BCCN) Fall Course on Computational Neuroscience. Max Planck Institute, Gottingen, Sep 2011.

Invited Talks

Reconstructing neural networks with Ising models. The Bioinformatics Network Seminar 2011. Trondheim, Norway, Sep 2011.

Kinetic Ising models with delayed interactions for neural data. Statistical Mechanics of Inference. Trondheim, Norway, Sep 2011.

Dynamical Ising models for analysis of neuronal spike trains. Interdisciplinary Applications of Statistical Physics & Complex Networks. Beijing, China, March 2011.

Self Organizing Maps: an exact analysis. Interdisciplinary Applications of Statistical Physics & Complex Networks. Beijing, China, March 2011.

Statistical Mechanics of Learning Vector Quantization. Workshop on Statistical Mechanics of Learning and Inference. Mariehamn, Finland, May 2010.

Theoretical approach to online and offline LVQ. Dagstuhl Seminar on Similarity based on Structures. Dagstuhl, Germany Feb 2009.

An Exact Approach for Learning Vector Quantization. Statistical Physics to Computer Science: Analysis of Biological and Medical Data (STABIL), Max-Planck-Institut fur Physik komplexer Systeme. Dresden, Germany Oct 2007.

Dynamics of Learning VQ and Neural Gas. Dagstuhl Seminar on Similarity-based Clustering and its Application to Medicine and Biology. Dagstuhl, Germany, Mar 2007.

Skills

· Programming: MATLAB, C/C++ and Fortran.
· Mathematics software: Mathematica, SPSS.
· Operating systems: Linux, Windows and Mac OSX.
· Experience with parallel computing, Object-Oriented Programming, shell scripting, LaTeX, Open Graphics Library, Unified Modeling Language

Languages

Indonesian (native), English (fluent), Dutch (good), Norwegian (intermediate), French (elementary).