CURRICULUM VITAE

of December 2021

NAME:	Omre, Karl Henning
PRESENT POSITION:	Professor in Statistics; Department of Mathematical Sciences; Norwegian University of Science & Technology (NTNU); Trondheim, Norway
COORDINATES:	website: www.math.ntnu.no/~omre
	pmail: IMF/NTNU 7491 Trondheim Norway
	email: omre@math.ntnu.no
	phone: +47 90 93 78 48
DATE OF BIRTH/ NATIONALITY:	August 13th, 1951/ Norwegian.
LANGUAGES:	Norwegian, English.
CIVIL STATUS:	Married, three children.

SCIENTIFIC BACKGROUND and PRIORITIES:

My educational background is a MSc in Statistics (Norwegian University of Science and Technology, Norway; 1975) and a Phd in Geostatistics (Stanford University, California; 1985). All my employments have been related to education and research – Norwegian Computing Center (NR) (1976-1999) and Norwegian University of Science and Technology (NTNU) (1992- present). At NR, I was partly responsible for a large reorganization of the Statistics-activity in 1984 and the development of the SAND-group thereafter. These actions brought NR to the forefront of applied statistical research internationally. I also established a software company in 1990 together with two colleagues. The company, named Odin as, still operates as a part of a larger international firm. As Professor in Statistics at Department of Mathematical Sciences, NTNU my time was split between teaching (MSc-level) and research (Phd-level). Currently I am a Professor Emeriti at Department of Mathematical Sciences, NTNU.

At NTNU, I spent considerable time on teaching since MSc-education is utmost important for the Norwegian society and provides the base for recruitment of competent Phd-candidates. During 1994-1998, I was the major responsible for the study program in Industrial Mathematics. In recent years I have also been involved in MSc-education at Hawassa University, South Ethiopia which I consider rewarding in a global perspective (see wiki.math.ntnu.no /mastmo).

My research time at NTNU was spent mostly in cooperation with Phd-students and most publications are jointly with them. I consider this Phd-focus to be a robust strategy for knowledge dissemination and I have supervised 21 Phd candidates. Further, the major topics of research are related to Bayesian spatial modelling and modelling of spatio-temporal phenomena, mostly applied to petroleum reservoir evaluation. Petroleum applications are highly relevant and important in Norway and this focus simplifies fund raising and provides job opportunities for the Phd students. Most of the research during 1994-2021 was funded by the multi-client consortium Uncertainty in Reservoir Evaluation – URE (see www.math.ntnu.no/ure). During 2014-2020 the activity at Hawassa University, Ethiopia also included the initiation of a Phd Program in Math&Stat Sciences. This Phd Program is the first of its kind in Ethiopia and 17 Phd-candidates were graduated. This educational initiative provides a solid base for future statistical activity in the country.

EDUCATION: Phd. Degree in 1985
Thesis in Geostatistics
'Alternative Variogram Estimators in Geostatistics'
Stanford University, Stanford,
California.

Sivilingenieur (MSc. equiv.), in 1975;
Majoring in Operational Research/Statistics;
Norwegian Institute of Technology (NTH), Trondheim,
Norway.

EMPLOYMENT:

2022 - pres: Professor Emeriti – Department of Mathematical Sciences, Norwegian University of Science and Technology; Trondheim.

1992 - 2021: Professor in Statistics - Department of Mathematical Sciences, Norwegian University of Science & Technology; Trondheim.

1984 - 1999: Head/Research Scientist of SAND Group - Norwegian Computing Center, Oslo.

1980 - 1984: Phd Student - Department of Applied Earth Sciences, Stanford University, Stanford, California.

1976 - 1980: Research Scientist - Norwegian Computing Center, Oslo

AWARDS:

2019 Sverdrup Award
Norwegian Statistical Association
- Recognition for outstanding contributions to Statistics in Norway – research in Geostatistics and teaching at Department of Mathematical Sciences, NTNU, Trondheim

2019 Recognition Award of Hawassa University, Hawassa, Ethiopia
- Recognition for extraordinary support in Strengthening Higher Education in mathematics and Statistics at Hawassa University.

2011 Alfred Wegeners Award
EAGE - European Association of Geoscientists and Engineers
- Recognition for outstanding contributions to Geostatistics, and applications to petroleum reservoir evaluation in particular.

2008 EMIL's Prize for Lecturers
MSc Program in Energy and Environment, NTNU

1996 Statoil's Award for Research Scientists
- Recognition for research results achieved in the petroleum disciplines at a high international level.

1995 SPE Editorial Review Committees Award as Technical Editor.

EXPERIENCE:

University teaching:

Lecturing: Many courses in Probability & Statistics at BSc, MSc and Phd level
MSc students: Advisor for approximately 60 students

University Phd supervision:

Ole Bernhard Forberg; 2017-2021 - NTE: Bayesian inversion of seismic data using multimodal selection Gaussian prior models

Maxime Conjard; 2016-2020 - Huawei: The Selection Kalman Model - Data assimilation for spatio-temporal variables with multimodal spatial histograms

Torstein Fjeldstad; 2015-2019 - NR: Spatial Gaussian Mixture Models Applied to Bayesian Seismic Inversion

Selamawit Serka; 2014-2018 - Hawassa University, Ethiopia: Bayesian Inversion of Non-Stationary Hidden Markov Models Applied to Sub-Surface Soil Classes

David Lindberg; 2010-2014 – DnV: Inference and categorical Bayesian inversion of convolved hidden Markov models applied to geophysical observations

Zeytu Gashaw; 2010-2014 – Hawassa University, Ethiopia: Inference and Prediction in Non-stationary Stochastic Models: Survival Analysis and Kriging Interpolation

Kjartan Rimstad; 2008-2011 – DnB: Spatial Mixture Modeling based on Latent Random fields applied to Seismic Inversion

Jon Sætrom; 2007-2010 - Statoil as: Reduction of Dimensionality in Spatio-Temporal Models

Marit Ulvmoen; 2005-2009 – NR: Markov Random Fields in Prestack Seismic Inversion into Lithology/Fluid classes

Inge Bjørn Myrseth; 2005-2009 – NR: Uncertainty Assessment in Ensemble Kalman Filters

Ole Petter Lødøen; 2001-2005 - Statoil as: Uncertainty in Complex Spatio-Temporal Models: Production History Conditioning in Reservoir Evaluation

Jo Roislien; 1999-2004 – UiO: Random Field Models and Near Well Reservoir Characterization

Jo Eidsvik; 1999-2003 – NTNU: Stochastic Reservoir Characterization and Integration in Near-well Regions

Ayele Taye Goshu; 1999-2003 - Hawassa University, Ethiopia: Spatial Statistics in Ground Water Modelling

Arild Buland; 1998-2002 - Statoil as: Statistical Methodology in Seismic Processing and Inversion

Odd Kolbjornsen; 1997-2002 – NR: Parameter Estimation in Spatial Models based on Indirect Observations

Hilde Borgos; 1996-2000 - Schlumberger as: Stochastic Modelling and Statistical Inference of Geological Fault Populations and Patterns

Alfhild Lien Eide; 1994-1999 - Statoil as: Stochastic Reservoir Characterization Constrained by Seismic Data

Anne-Randi Syversveen; 1993-1998 – NR: Spatial Stochastic Point Models for Reservoir Characterization

Bjørn Kåre Hegstad; 1993-1997 - Statoil as: Sampling from Stochastic Reservoir Models Constrained by Production Data

Håkon Tjelmeland; 1992-1996 – NTNU: Stochastic Models in Reservoir Characterization and Markov Random Fields for Compact Objects

PhD Committees:

NTNU, Norway
University of Oslo, Norway
Aalborg University, Denmark
Strassbourg University, France
Delft University, Holland
University of Copenhagen, Denmark
University of Bergen, Norway
Umeå University, Sweden
University of Edinburgh, Scotland

Conference and Organization Chairs:

Head of Norwegian Statistical Association – June 2019-2021
The Hawassa Math&Stat Int Conference – Hawassa, Ethiopia – February 2019
Petroleum Geostatistics, EAGE – Biarritz, France – September 2014
Petroleum Geostatistics, EAGE – Cascais, Portugal – September 2007
Several EAGE Workshops

SCIENTIFIC GRANTS:

2019 – 2020	HU Phd Programme in Math & Stat Sci Extension NORAD/Norhed NOK 2.6 mill
2014 - 2018	Uncertainty in Reservoir Evaluation – URE Research Initiative/ Six NTNU professors NOK 17.5 from seven companies, The Research Council of Norway and NTNU incl 6 Phd grants
2014 - 2019	HU Phd Programme in Math & Stat Sci - project/ Five professors from NTNU/UiO/HiMolde Initiation of Phd-programme at Hawassa University, Ethiopia NORAD/Norhed NOK 9.35 mill
2009 – 2012	MASTMO – project/ Three IMF-professors Extension – incl. two Quota-Phd grants at NTNU NORAD/NOMA NOK 1.3 mill.
2008 –2012	MASTMO – project / Three IMF-professors Initiation of MSc-programme at Hawassa University, Ethiopia NORAD/NOMA NOK 4.5 mill
2008 - 2012	Uncertainty in Reservoir Evaluation - URE Research Initiative - six NTNU professors NOK 9.4 mill. from four companies, The Research Council of Norway and NTNU incl. 4 Phd grants
2006 – 2010	Bayesian Lithology-Fluid Inversion based on Well and Seismic Data Four NTNU professors NOK 6.8 mill. from three companies and The Research Council of Norway incl. 3 Phd grants
2003 – 2007	Uncertainty in Reservoir Evaluation – URE Research Initiative Five NTNU professors NOK 8.0 mill. from four companies, The Research Council of Norway and NTNU incl. 4 Phd grants
1998 -2003	Uncertainty in Reservoir Evaluation – URE Research Initiative Five NTNU professors NOK 7.7 mill. from four companies and The Research Council of Norway incl. 5 Phd grants
1999	Schlumberger Stichting Foundation Grant US$ 15 000

1997 – 1998 Norsk Hydro
Post.doc.grant NOK 0.5 mill.

1996 – 1999 Vista/Statoil
One Phd grant NOK 1.05 mill.

1996 – 1998 European Community: Joule/
Production Forecasting with Uncertainty Quantification/
2/3 post. doc; NOK 1.5 mill.

1994 – 1996 Norwegian Research Council
Strategic University Program; 'Uncertainty in Management of Natural Resources;
NOK 4.1 mill. with three other professors incl. 3 Phd grants.

1993 – 1995 European Community; Joule II/Geosciences II
Reservoir Engineering Project/Topic 5;
NOK 2.2 mill. incl. one Phd grant.

1992 - 1996 Norwegian Research Council; PROPETRO/
Two Phd grants 2 x NOK 0.9 mill.

Research - Recent work:

Henning Omre - www.math.ntnu.no/~omre

Professor in Statistics (1992-2021)
Department of Mathematical Sciences
Norwegian University of Science & Technology
Trondheim
Norway

December 2021

Selected publications:

Forberg, O.B.; Kjøsnes, Ø. and Omre, H.; 2021: *Bayesian seismic AVO inversion using a laterally coupled multimodal prior model*; IEEE Transactions on Geoscience and Remote Sensing, to appear.

Grana, D.; Mosegaard, K. and Omre, H.; 2021: *Bayesian inversion in Geosciences*; in Earth Science Series: Encyclopedia of Mathematical Geosciences; Springer Verlag

Omre, H. and Rimstad, K.; 2021: *Bayesian Spatial Inversion and Conjugate Selection Gaussian Prior Models*; SIAM/ASA Journal of Uncertainty Quantification, Vol.9, No.2, pp 420-445.

Conjard, M. and Omre, H.; 2021: *Spatio-temporal Inversion using the Selection Kalman Model*; Frontiers in Applied Mathematics and Statistics/ Section Dynamical Systems, to appear

Forberg, O.B.; Kjøsnes, Ø. and Omre, H.; 2021: *Bayesian seismic amplitude variation with offset inversion for reservoir variables with bimodal spatial histograms*; Geophysics, Vol.86, No.3, pp R331-R350.

Forberg, O.B.; Grana, D. and Omre, H.; 2021: *Bayesian inversion of time-lapse seismic AVO data for multimodal reservoir properties*; IEEE Transactions on Geoscience and Remote Sensing, Vol.59, No.11, pp 9104-9119.

Fjeldstad, T.; Avseth, P. and Omre, H.; 2021: *A one-step Bayesian inversion framework for three-dimensional reservoir characterization based on a Gaussian mixture model – A Norwegian Sea demonstration*; Geophysics, Vol.86, No.2, pp R221-R236.

Tian, M., Omre, H. and Xu, H.; 2021: *Inversion of well logs into lithology classes accounting for spatial dependencies by using hidden Markov models and recurrent neural networks*; Journal of Petroleum Science and Engineering; Vol.196, Paper 107598

Conjard, M. and Omre, H.; 2020: *Data Assimilation in Spatio-Temporal Models with Non-Gaussian Initial States—The Selection Ensemble Kalman Model*; Applied Sciences, Vol.10, No.17, Paper 5742

Madsen, R. B., Hansen, T. M. and Omre, H.; 2020: *Estimation of a non-stationary prior covariance from seismic data*; Geophysical Prospecting, Vol.68, No.2, pp 393-410.

Fjeldstad, T. and Omre, H.; 2019: *Bayesian inversion of convolved hidden Markov models with applications in reservoir prediction*; IEEE Transactions on Geoscience and Remote Sensing, Vol.58, No.3, pp 1957-1968.

Moja S. S., Asfaw Z. G. and Omre, H.; 2019: *Bayesian inversion in Hidden Markov Models with Varying Marginal Proportions*; Mathematical Geosciences; Vol. 51, No.4, pp 463-485.

Grana, D.; Fjeldstad, T. M.; Omre, H.; 2017: *Bayesian Gaussian Mixture Linear Inversion for Geophysical Inverse Problems*; Mathematical Geosciences; Vol.49, No.4, pp 493-516.

Asfaw, Z. G. and Omre, H.; 2016: *Localized/Shrinkage Kriging Predictors*, Mathematical Geosciences, Vol.48, pp 595-618.

Lindberg, D. and Omre, H.; 2015: *Inference of the Transition Matrix in Convolved Hidden Markov Models and the Generalized Baum -Welch Algorithm*, IEEE Transactions on Geoscience and Remote Sensing, Vol.53, No.12, pp 6443-6456.

Lindberg, D., Rimstad, E. and Omre, H.; 2015: *Inversion of Well Logs into Facies accounting for Spatial Dependencies and Convolution Effects*, Journal of Petroleum Science and Engineering, Vol.134, pp 237-246.

Lindberg, D. and Omre, H.; 2014: *Blind Categorical Deconvolution in Two-level Hidden Markov Models*, IEEE Transactions on Geoscience and Remote Sensing, Vol.52, No.11, pp 7435-7447.

Rimstad, K. and Omre, H.; 2014: *Skew-Gaussian Random Fields*, Spatial Statistics, Vol. 10, pp 43-62.

Saetrom, J. and Omre, H.; 2013: *Uncertainty Quantification in the Ensemble Kalman Filter*, Scandinavian Journal of Statistics, Vol.40, pp 868-885

Myrseth, I.; Saetrom, J. and Omre, H.; 2013: *Resampling the ensemble Kalman filter*, Computers and Geosciences; Vol.55, pp 44-53

Rimstad, K. and Omre, H.; 2013: *Approximate posterior distributions for convolutional two-level hidden Markov models*; Computational Statistics and Data Analysis, Vol.58, pp 187-200

Rimstad, K.; Avseth, P. and Omre, H.; 2012: *Hierarchical Bayesian Lithology/Fluid Prediction: A North Sea Case Study*; Geophysics, Vol.77, No.2, pp B69-B85

Saetrom, J. and Omre, H.; 2011: *Ensemble Kalman filtering for non-linear likelihood models using kernel-shrinkage regression techniques*, Computational Geosciences, Vol.15, No.3, pp 529-544.

Saetrom, J. and Omre, H.; 2011: *Ensemble Kalman filtering with shrinkage regression techniques*, Computational Geosciences, Vol.15, No.2, pp 271-292.

Myrseth, I. and Omre, H.; 2010: *Hierarchical Ensemble Kalman Filter*, SPE Journal, Vol.15, No.2, pp 569-580.

Rimstad K. and Omre, H.; 2010*: Impact of rock-physics trends and Markov random fields on hierarchical Bayesian lithology/fluid prediction*.; Geophysics, Vol.75, No.4, pp R93-R108.

Myrseth, I. and Omre, H.; 2010: *The ensemble Kalman filter and related filters* in Large-Scale Inverse Problems and Quantification of Uncertainty by L. Biegler, G. Biros, O. Ghattas, M. Heinkenschloss, D. Keyes, B. Mallick, Y. Marzouk, L. Tenorio, B. van Bloemen Waanders and K. Willcox (eds), John Wiley & Sons, UK, Chapter 11, pp 217-246

Rimstad, K., Avseth, P. and Omre, H.; 2010: *Bayesian Lithology/fluid prediction constrained by spatial couplings and rock physics depth trends*; The Leading Edge, May 2010, Vol.29, No.5, pp 584-589.

Ulvmoen, M., Omre, H. and Buland, A.; 2010*: Improved resolution in Bayesian lithology/fluid inversion from prestack seismic data and well observations: Part 2 - Real case study*; Geophysics, Vol.75, No.2, pp B73-B82.

Ulvmoen, M. and Omre, H.; 2010*: Improved resolution in Bayesian lithology/fluid inversion from prestack seismic data and well observations: Part 1 - Methodology*; Geophysics, Vol.75, No.2, pp R21-R35.

Karimi, O., Omre, H. and Mohammadzadeh, M.; 2010: *Bayesian closed-skew Gaussian inversion of seismic AVO data into elastic material properties*; Geophysics, Vol.75, No.1, pp R1-R11.

Lodoen, O.P. and Omre, H.; 2008: *Scale-corrected Ensemble Kalman Filtering Applied to Production History Conditioning in Reservoir Evaluation*; SPE Journal, Vol.12, No.2, pp 177-194.

Larsen, A.L.; Ulvmoen, M.; Omre, H. and Buland, A.; 2006: *Bayesian Lithology-Fluid Prediction and Simulation on the basis of a Markov Chain Prior Model*; Geophysics, Vol.71, No.5, pp 69-78.

Roislien, J. and Omre, H.; 2006: *T-distributed Random Fields: A parametric model for Heavy-tailed Well-log Data*, Mathematical Geology, Vol.38, No.7, pp 821- 850.

Kolbjornsen, O. and Omre, H.; 2005: *Bayesian Inversion of Piecewise Affine Operators in a Gaussian Framework*; Journal of Computational and Graphical Statistics, Vol.14, No.1, pp 56-74.

Eidsvik, J.; Avseth, P.; Omre, H.; Mukerji, T. and Mavko, G.; 2004: *Stochastic Reservoir Characterization using Pre-stack Seismic Data*; Geophysics, Vol.69, No.4, pp 978-993.

Omre, H. and Lodoen, O.P.; 2004: *Improved Production Forecasts and History Matching using Approximate Fluid Flow Simulators*; SPE Journal, September 2004, pp 339-351.

Buland, A. and Omre, H.;2003: *Bayesian Wavelet estimation from seismic and well data*; Geophysics, Vol.68, No. 6, pp 2000-2009.

Buland, A.; Kolbjornsen, O. and Omre, H.;2003: *Rapid Spatially Coupled AVO Inversion in the Fourier Domain*, Geophysics, Vol.68, No.1, pp 824-836.

Buland, A. and Omre, H.; 2003: *Joint AVO Inversion, Wavelet Estimation, and Noise Level Estimation using a Spatially Coupled Hierarchical Bayesian Model*; Geophysical Prospecting, 51, pp 531-550.

Buland, A. and Omre, H.; 2003: *Bayesian linearized AVO Inversion*; Geophysics, Vol.68, No.1, pp 185-198.

Borgos, H.G., Omre, H. and Townsend, C.; 2002: *Size distribution of geological faults: Model choice and parameter estimation*; Statistical Modelling, Vol.2, pp 217-234.

Eide, A.L.; Omre, H. and Ursin, B.; 2002: *Prediction of Reservoir Variables Based on Seismic Data and Well Observations*; Journal of the American Statistical Association (JASA), Vol.97, No.457, pp 18-28.

Lia, O.; Omre, H.; Tjelmeland, H.; Holden, L. and Egeland; T.; 1997: *Uncertainties in Reservoir Production Forecasts*; AAPG Bulletin, Vol.81, No.5 (May 1997), pp 775-801.

Syversveen, A.R. and Omre, H.;1997: *Conditioning of Marked Point Processes within a Bayesian Framework;* Scandinavian Journal of Statistics, Vol.24, No.3, pp 341-352.

Host, G.; Omre, H. and Switzer, P.;1995: *Spatial Predictions of Air Pollution from Spatial/Temporal Observations*; Journal of the American Statistical Association (JASA), Vol.90, No.431, pp 853-861.

Hjort, N.L. and Omre, H.;1994: *Topics in Spatial Statistics*; Scandinavian Journal of Statistics, Vol.21, No.4, pp 289-358.

Omre, H. and Halvorsen, K.B.;1989: *The Bayesian Bridge between Simple and Universal Kriging*; Mathematical Geology, Vol.21, No.7, pp 767-786.

Omre, H.;1987: *Bayesian Kriging - Merging Observations and Qualified Guesses in Kriging*; Mathematical Geology, Vol.19, No.1, pp 25-39.

Omre, H.;1983: *The Combination of Subjective Information and Drillhole Data for Estimating the Size of an Elliptical Target*; Mathematical Geology, Vol.15, No.3, pp 477-481.