

Curriculum vitae: Barbara Hammer

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Personal Details:

Barbara Hammer,
female, born 31.7.1970 in Mannheim, Germany;
married, nationality: German

Professional Address:

Prof. Dr. B. Hammer, Department of Computer Science, Clausthal University of Technology
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Academic education:

- 10.89 – 03.95: Diploma studies at the Department of Mathematics/Computer Science, Universität Osnabrück, Germany. Thesis in pure mathematics, titled ‘Die Beilinsonspektralsequenz und Anwendungen’ (The Beilinson spectral sequence and applications), Diploma examination in March 1995, ‘with distinction’.
- 04.95 – 06.99: Pd.D. studies at the Department of Mathematics/Computer Science, Universität Osnabrück. Thesis in computer science on ‘Learning with recurrent neural networks’, Ph.D. examination on June 6, 1999, ‘with distinction’, supervisor: Prof. Dr. V. Sperschneider, external referee: Prof. Dr. M. Vidyasagar.
- 12.2003: Venia legendi in computer science (‘Habilitation’), thesis titled ‘Mathematical aspects of Neural Networks’, external referees: Prof. Dr. T. Martinetz, Prof. Dr. A. Sperduti

Scientific employment:

- 04.91–03.95: Part-time employment as a student assistant at the Department of Mathematics/Computer Science, Universität Osnabrück.
- 04.95–03.00: Full-time employment as a research assistant at the Department of Mathematics/Computer Science, Universität Osnabrück.
- 4.00–09.04: Full-time employment as researcher at the Department of Mathematics/Computer Science, Universität Osnabrück; leader of the young research group ‘Learning with neural methods on structured data’ funded by the Ministry of Science and Culture, Lower Saxony.
- 04.02–09.02: I temporarily hold the chair for ‘Neuroinformatik’ at the Department of Mathematics/Computer Science, Universität Osnabrück.
- 10.04–04.10 Associate professor for ‘Theoretische Grundlagen der Informatik’ (Theoretical Computer Science) at the Computer Science Institute of Clausthal University of Technology.
- since 04.10 Associate professor for ‘Theoretische Informatik für Kognitive Systeme’ (Theoretical Computer Science for Cognitive Systems) at the University of Bielefeld.

Awards:

For my work as student assistant and my Master studies I received the award ‘Studienpreis 1994 der Gemeinschaft der Förderpreisstifter der Universität Osnabrück’. For my Ph.D. thesis I received the award ‘Promotionspreis 1999 der Universitätsgesellschaft Osnabrück’. Further, I received a best paper award at ICANN’02, a best presentation award at ISNC’98, and a best paper award at KI’07.

Stays abroad:

- 09.99: Visit to Prof. E. Sontag, Prof. B. DasGupta at Rutgers University, New Brunswick/Camden, U.S.A.
- 02.00-03.00: Visit to the group of Prof. M. Vidyasagar at the Center for Artificial Intelligence and Robotics, Bangalore, India.
- 11.01-12.01: Visit to Prof. A. Sperduti at the Università di Pisa, Pisa, Italy.
- 02.03: Visit to Prof. A. Sperduti at the Università di Padova, Padova, Italy.
- 09.03: Visit to Dr. P. Tiño at the University of Birmingham, Birmingham, U.K.
- 03.05: Visit to Prof. M. Cottrell at the Université Paris I, Paris, France
Visit to Dr. M. Biehl at the University of Groningen, Groningen, The Netherlands

Scientific activities and memberships:

- I am a reviewer for various international scientific journals and conferences including Annals of Mathematics and Artificial Intelligence; Applied Artificial Intelligence; Applied Intelligence; ECAI; ESANN; Neural Computation; Neural Processing Letters; Neurocomputing; Neural Networks; Neural Networks World; ICANN; ICML; IJCNN; NIPS; Systems, Man and Cybernetics; TALANTA.
- In addition I participated as program committee member in several scientific workshops and conferences (including ESANN, ICANN, IJCNN, ANNPR, ASC, ANNS, ESANN, WSOM, KI, NeSy).
- Jointly with colleagues, I organized special sessions at seven ESANN conferences.
- Jointly with colleagues, I organized special issues for the journals Neurocomputing, Neural Networks, Journal of Algorithms in Cognition, Informatics, and Logic.
- I coorganized three Dagstuhl seminars and one seminar at MPI PKS, Dresden.
- I have been invited by the Alexander von Humboldt foundation to coorganize a session on Computer Science at two Japanese German Frontiers of Science conferences.
- I acted as expert evaluator for several scientific organizations including NWO, DFG, FWF, NRF, Alexander von Humboldt Foundation.
- I have been invited to participate in several national and international Ph.D. committees.
- I am a member of the editorial board of Neurocomputing, Neural Processing Letters, and IEEE TNN.
- I am a member of the German 'Gesellschaft für Informatik' the 'European Neural Networks Society', and IEEE CIS.

Research interests:

- Learning with neural methods for structured data, neuro-symbolic integration,
- Theory of neural systems, statistical learning theory, theory of on-line learning,
- Recurrent and recursive neural networks,
- Prototype based methods, learning vector quantization,

- Unsupervised learning, self-organizing maps,
- Relevance learning, learning metrics,
- Data visualization,
- Models for very large data sets,
- Applications in bioinformatics

Publications (as of January 2010)

Books

- M. Biehl, B. Hammer, M. Verleysen, and T. Villmann, editors. *Similarity Based Clustering*. Springer Lecture Notes Artificial Intelligence Vol. 5400/2009. Springer, 2009.
- B. Hammer and P. Hitzler, editors. *Perspectives of Neural-Symbolic Integration*, volume 77 of *Studies in Computational Intelligence*. Springer, Berlin, 2007.
- B. Hammer, *Learning with Recurrent Neural Networks*, Lecture Notes in Control and Information Sciences 254, Springer-Verlag, 2000.
- V. Sperschneider, B. Hammer, *Theoretische Informatik – Eine problemorientierte Einführung*, Springer-Verlag, 1996.

Book chapters

- M. Biehl, B. Hammer, P. Schneider, T. Villmann. Metric learning for prototype based classification. In M. Bianchini, M. Maggini, F. Scarselli, *Innovations in Neural Information Paradigms and Applications*. *Studies in Computational Intelligence* 247, pages 183-199. Springer, 2009
- T. Villmann, B. Hammer, and M. Biehl. On the convergence of neural gas. In M. Biehl, B. Hammer, M. Verleysen, and T. Villmann, editors, *Similarity Based Clustering*. *Lecture Notes Artificial Intelligence* Vol. 5400, pages 23-34. Springer, 2009.
- B. Hammer, A. Hasenfuss, and F. Rossi. Median topographic maps for biological data sets. In M. Biehl, B. Hammer, M. Verleysen, and T. Villmann, editors, *Similarity Based Clustering*, *Lecture Notes Artificial Intelligence* Vol. 5400, pages 92-117. Springer, 2009.
- F. Schleif, B. Hammer, T. Villmann. Analysis of Spectral Data in Clinical Proteomics by use of Learning Vector Quantizers in M. Van de Werff and A. Delder and R. Tollenaar (Eds.), *Computational Intelligence in Biomedicine and Bioinformatics: Current Trends and Applications*, Kapitel 6, 141-167. Springer, 2008.
- Frank-M. Schleif, T. Villmann, and B. Hammer. Pattern recognition by supervised relevance neural gas and its application to spectral data in bioinformatics. In J. Dopico, J. la Calle, and A. Sierra, editors, *Encyclopedia of Artificial Intelligence*, pages 1337-1342. Information Science Reference, 2008.
- F.-M. Schleif, B. Hammer, and T. Villmann. Analysis of spectral data in clinical proteomics by use of learning vector quantizers. In T. Smolinski, M. Milanova, and A. Hassanien, editors, *Computational Intelligence in Biomedicine and Bioinformatics: Current Trends and Applications*, chapter 6, pages 141-167. Springer, 2008.
- B. Hammer, A. Micheli, and A. Sperduti. Adaptive contextual processing of structured data by recursive neural networks: A survey of computational properties. In B. Hammer and P. Hitzler, editors, *Perspectives of Neural-Symbolic Integration*, volume 77 of *Studies in computational Intelligence*, pages 67-94. Springer, Berlin, 2007.

- P. Tino, B. Hammer, and M. Boden. Markovian bias of neural-based architectures. In B. Hammer and P. Hitzler, editors, *Perspectives of Neural-Symbolic Integration*, volume 77 of *Studies in computational Intelligence*, pages 95-134. Springer, Berlin, 2007.
- B. Hammer, M. Strickert, T. Villmann, Prototype based recognition of splice sites, in: U. Seiffert, L.C. Jain, P. Schweitzer (eds.), *Bioinformatics using computational intelligence paradigms*, Springer, 25-55, 2005.
- B. Hammer, Perspectives on learning symbolic data with connectionistic systems, in: R. Kühn, R. Menzel, W. Menzel, U. Ratsch, M. M. Richter, I. Stamatescu (eds.), *Adaptivity and Learning*, 141-160, Springer, 2003.
- B. Hammer, Compositionality in neural systems, in: M. Arbib (eds), *Handbook of Brain Theory and Neural Networks*, 2nd edition, MIT Press, 244-248, 2002.

Editorial

- M. Gori, B. Hammer, P. Hitzler, G. Palm, Perspectives and challenges for recurrent neural network training. *Journal of Algorithms in Cognition, Informatics, and Logic*. To appear.
- B. Hammer, C. Saunders, A. Sperduti, Neural Networks and Kernel Methods for Structured Domains, *Neural Networks* 18:1015-1018, 2005.
- M. Cottrell, B. Hammer, T. Villmann, New aspects in Neurocomputing, *Neurocomputing* 63, 1-3, 2005.

Publications accompanying invited talks and organized special sessions

- B. Hammer and A. Hasenfuss. Clustering very large dissimilarity data sets. In N. El Gayar and F. Schwenker, editors, *ANNPR'2010*, to appear. Springer, 2010.
- T. Villmann, F.-M. Schleif, and B. Hammer. Sparse representation of data. In M. Verleysen, editor, *ESANN'10*, page to appear. D-side publications, 2010.
- B. Hammer, B. Schrauwen, J.J. Steil. Recent advances in efficient learning of recurrent networks. In M. Verleysen, editor, *Proc. Of European Symposium on Artificial Neural Networks (ESANN'2009)*, pages 213-226. d-side publications, 2009.
- B. Hammer and T. Villmann. How to process uncertainty in machine learning. In M. Verleysen, editor, *Proc. Of European Symposium on Artificial Neural Networks (ESANN'2007)*, pages 79-90, Brussels, Belgium, 2007. d-side publications.
- U. Seiffert, B. Hammer, S. Kaski, T. Villmann, Tutorial: Neural Networks and Machine Learning in Bioinformatics - Theory and Applications, in: M. Verleysen (eds), *ESANN'2006*, D-side publications, 521-532, 2006.
- B. Hammer, A. Micheli, N. Neubauer, A. Sperduti, M. Strickert, Self-organizing maps for time series, in: *Proceedings of WSOM'2005*, 115-122, 2005.
- B. Hammer, T. Villmann, Tutorial: Classification using non-standard metrics, in: M. Verleysen (eds), *ESANN'2005*, D-side publications, 303-316, 2005.
- B. Hammer, B.J. Jain, Tutorial: Neural methods for non-standard data, in: M. Verleysen (eds), *ESANN'2004*, D-side publications, 281-292, 2004.
- B. Hammer, T. Villmann, Tutorial: Mathematical aspects of neural networks, in: M. Verleysen (eds), *ESANN'2003*, D-side publications, 59-72, 2003.

- B. Hammer, J.J. Steil, Tutorial: Perspectives on learning with recurrent networks, in: M.Verleysen (eds), ESANN'2002, D-side publications, 357-368, 2002

Journal articles

- P. Schneider, B. Biehl, and B. Hammer. Hyperparameter learning in probabilistic prototype based models. *Neurocomputing*, to appear.
- K. Bunte, B. Hammer, A. Wismueller, and M. Biehl. Adaptive local dissimilarity measures for discriminative dimension reduction of labeled data. *Neurocomputing*, to appear.
- Banchar Arnonkijpanich, Alexander Hasenfuss, and Barbara Hammer. Local matrix adaptation in clustering and applications for manifold visualization. *Neural Networks*, to appear.
- S. Simmteit, F.-M. Schleif, T. Villmann, and B. Hammer. Retrieval of mass spectrometric bacteria data using evolving trees. *Knowledge and Information Systems*, to appear.
- P. Schneider, M. Biehl, and B. Hammer. Adaptive relevance matrices in learning vector quantization. *Neural Computation*, 21:3532-3561, 2009.
- P. Schneider, M. Biehl, and B. Hammer. Distance learning in discriminative vector quantization. *Neural Computation*, 21:2942-2969, 2009.
- N. Alex, A. Hasenfuss, and B. Hammer. Patch clustering for massive data sets. *Neurocomputing*, 72(7-9):1455-1469, 2009.
- Th. Villmann, B. Hammer, Frank-M. Schleif, W. Hermann, and M. Cottrell. Fuzzy classification using information theoretic learning vector quantization. *Neurocomputing*, 16-18:3070-3076, 2008.
- F.-M. Schleif, B. Villmann, M. Kostrzewa, B. Hammer, and A. Gammernan. Cancer informatics by prototype networks in mass spectrometry. *Artificial Intelligence in Medicine* 45: 215-228, 2009.
- A. Witoelar, M. Biehl, A. Ghosh, and B. Hammer. Learning dynamics and robustness of vector quantization and neural gas. *Neurocomputing*, 71:1210-1219, 2008.
- F.-M. Schleif, Th. Villmann, and B. Hammer. Prototype based fuzzy classification in clinical proteomics. *International Journal of Approximate Reasoning*, 47(1):4-16, 2008.
- T. Villmann, F.-M. Schleif, M. Kostrzewa, A. Walch and B. Hammer. Exploration of mass spectrometric data in clinical proteomics using learning vector quantization methods. *Briefings in Bioinformatics*, 9(2):129-143, 2008.
- M. Biehl, A. Ghosh, and B. Hammer. Dynamics and generalization ability of LVQ algorithms. *Journal of Machine Learning Research*, 8:323-360, 2007.
- B. Hammer, A. Hasenfuss, and Th. Villmann. Magnification control for batch neural gas. *Neurocomputing*, 70(7-9):1225-1234, 2007.
- F.-M. Schleif, B. Hammer, and Th. Villmann. Margin based active learning for LVQ networks. *Neurocomputing*, 70(7-9):1215-1224, 2007.
- B. Hammer, Th. Villmann, Effizient Klassifizieren und Clustern: Lernparadigmen von Vektorquantisierern, *Künstliche Intelligenz* 6(3):5-11, 2006.
- M. Cottrell, B. Hammer, A. Hasenfuss, T. Villmann, Batch and Median Neural Gas, *Neural Networks* 19:762-771, 2006.

- T. Villmann, B. Hammer, F.-M. Schleif, T. Geweniger, Fuzzy Labeled Neural Gas for Fuzzy Classification, *Neural Networks* 19:772-779, 2006.
- A. Gosh, M. Biehl, B. Hammer, Performance analysis of LVQ Algorithms: a statistical physics approach, *Neural Networks* 19:817-829, 2006.
- T. Villmann, F.-M. Schleif, B. Hammer, Prototype-based fuzzy classification with local relevance for proteomics, *Neurocomputing* 69(16-18):2425-2428, 2006.
- M. Biehl, A. Gosh, B. Hammer, Learning Vector Quantization: the dynamics of Winner-Takes-All algorithms, *Neurocomputing* 69(7-9):660-670, 2006.
- M. Strickert, U. Seiffert, N. Sreenivasulu, W. Weschke, T. Villmann, B. Hammer, Generalized Relevance LVQ (GRLVQ) with Correlation Measures for Gene Expression Analysis, *Neurocomputing* 69(6-7):651-659, 2006.
- T. Villmann, F. Schleif, B. Hammer, Comparison of Relevance Learning Vector Quantization with other Metric Adaptive Classification Methods, *Neural Networks* 19:610-622, 2006.
- B. Hammer, A. Micheli, A. Sperduti, Universal approximation capability of cascade correlation for structures, *Neural Computation* 17:1109-1159, 2005.
- M. Strickert, B. Hammer, Merge SOM for temporal data, *Neurocomputing* 64:39-72, 2005
- M. Strickert, B. Hammer, S. Blohm, Unsupervised recursive sequence processing, *Neurocomputing* 63:69-98, 2005.
- K. Gersmann, B. Hammer, Improving iterative repair strategies for scheduling with the SVM, *Neurocomputing* 63:271-292, 2005.
- B. Hammer, M. Strickert, T. Villmann, Supervised Neural Gas with General Similarity Measure, *Neural Processing Letters* 21(1):21-44, 2005.
- B. Hammer, M. Strickert, T. Villmann, On the generalization ability of GRLVQ networks, *Neural Processing Letters* 21(1):21-44, 2005.
- B. DasGupta, B. Hammer, On approximate learning by multi-layered feedforward circuits, *Theoretical Computer Science* 348:95-127, 2005.
- B. Hammer, A. Micheli, A. Sperduti, M. Strickert, Recursive self-organizing network models, *Neural Networks* 17(8-9):1061-1086, 2004.
- B. Hammer, A. Micheli, A. Sperduti, M. Strickert, A general framework for unsupervised processing of structured data, *Neurocomputing* 57, 3-35, 2004.
- P. Tiño, B. Hammer, Architectural bias in recurrent neural networks – fractal analysis, *Neural Computation* 15(8):1931-1957, 2003.
- B. Hammer, P. Tiño, Recurrent neural networks with small weights implement definite memory machines, *Neural Computation* 15(8):1897-1929, 2003.
- B. Hammer, K. Gersmann, A note on the universal approximation capability of support vector machines, *Neural Processing Letters* 17, 45-53, 2003.
- T. Villmann, E. Merényi, B. Hammer, Neural maps in remote sensing image analysis, *Neural Networks* 16(3-4),389-403, 2003.

- B. Hammer, T. Villmann, Generalized relevance learning vector quantization, *Neural Networks* 15, 1059-1068, 2002.
- B. Hammer, Recurrent networks for structured data - a unifying approach and its properties, *Cognitive Systems Research* 3(2), 145-165, 2002.
- B. Hammer, Generalization ability of folding networks, *IEEE Transactions on Knowledge and Data Engineering*, 13(2): 196-206, 2001.
- M. Vidyasagar, S. Balaji, B. Hammer, Closure properties of uniform convergence of empirical means and PAC learnability under a family of probability measures, *System and Control Letters* 42, 151-157, 2001.
- B. Hammer, On the approximation capability of recurrent neural networks, *Neurocomputing*, 31(1-4), 107-124, 2000.
- B. Hammer, On the learnability of recursive data, *Mathematics of Control Signals and Systems* 12, 62-79, 1999.

Conference papers (reviewed)

- Banchar Arnonkijpanich and Barbara Hammer. Global coordination based on matrix neural gas for dynamic texture synthesis. In N. El Gayar and F. Schwenker, editors, *ANNPR'2010*, page to appear. Springer, 2010.
- T. Villmann, S. Haase, F.-M. Schleif, B. Hammer, and M. Biehl. The mathematics of divergence based online learning in vector quantization. In N. El Gayar and F. Schwenker, editors, *ANNPR'2010*, page to appear. Springer, 2010.
- K. Bunte, B. Hammer, T. Villmann, M. Biehl, and A. Wismüller. Exploratory observation machine (xom) with kullback-leibler divergence for dimensionality reduction and visualization. In M. Verleysen, editor, *ESANN'10*, page to appear. D side, 2010.
- A. Gisbrecht, B. Mokbel, and B. Hammer. Relational generative topographic map. In M. Verleysen, editor, *ESANN'10*, page to appear. D side, 2010.
- A. Gisbrecht and B. Hammer. Relevance learning in generative topographic maps. In M. Verleysen, editor, *ESANN'10*, page to appear. D side, 2010.
- K. Bunte, B. Hammer, and M. Biehl. Nonlinear dimension reduction and visualization of labeled data. In X. Jiang and N. Petkov, editors, *International Conference on Computer Analysis of Images and Patterns*, pages 1162-1170. Springer, 2009.
- T. Villmann and B. Hammer. Functional principal component learning using Oja's method and Sobolev norms. In J.C. Principe and R. Miikkulainen, editors, *Advances in Self-Organizing Maps, WSOM 2009*, pages 325-333, 2009.
- T. Geweniger, D. Zühlke, B. Hammer, T. Villmann. A fuzzy variant of affinity propagation in comparison to median c-means. In J.C. Principe and R. Miikkulainen, editors, *Advances in Self-Organizing Maps, WSOM 2009*, pages 72-79, 2009.
- Bassam Mokbel, Alexander Hasenfuss, and Barbara Hammer. Graph-based representation of symbolic musical data. In Andrea Torsello, Francisco Escolano, and Luc Brun, editors, *Graph-Based Representation in Pattern Recognition (GbRPR 2009)*, volume 5534 of *Lecture Notes in Computer Science*, pages 42-51, Berlin, 2009. Springer.

- T. Geweniger, D. Zühlke, B. Hammer, T. Villmann. Median variant of fuzzy-c-means. In M. Verleysen, editor, European Symposium on Artificial Neural Networks, pages 523-528. d-side publications, 2009.
- A. Witolaer, M. Biehl, and B. Hammer. Equilibrium properties of online LVQ. In M. Verleysen, editor, European Symposium on Artificial Neural Networks, pages 535-540. d-side publications, 2009.
- P. Schneider, M. Biehl, and B. Hammer. Hyperparameter learning in robust soft LVQ. In M. Verleysen, editor, European Symposium on Artificial Neural Networks, pages 517-522. d-side publications, 2009.
- K. Bunte, M. Biehl, and B. Hammer. Nonlinear discriminative data visualization. In M. Verleysen, editor, European Symposium on Artificial Neural Networks, pages 65-70. d-side publications, 2009.
- Alexander Hasenfuss, Wibke Boerger, and Barbara Hammer. Topographic processing of very large text datasets. In Cihan H. Dagli et al., editor, Smart Systems Engineering: Computational Intelligence in Architecting Engineering Systems (ANNIE 2008), volume 18 of Intelligent Engineering Systems Through Artificial Neural Networks, pages 525-532, New York, 2008. ASME Press.
- T. Geweniger, F.-M. Schleich, A. Hasenfuss, B. Hammer, and T. Villmann. Comparison of cluster algorithms for the analysis of text data using Kolmogorov complexity. In Mario Köppen, Nikola K. Kasabov, and George G. Coghill, editors, ICONIP 2008, pages 61-69. Springer, 2008.
- T. Winkler, J. Drieseberg, A. Hasenfuss, B. Hammer, and K. Hormann. Thinning mesh animations. In O. Deussen, D. Keim, and D. Saupe, editors, Proceedings of Vision, Modeling, and Visualization 2008, pages 149-158, Konstanz, Germany, oct 2008. Aka.
- N. Alex and B. Hammer. Parallelizing single pass patch clustering. In M. Verleysen, editor, European Symposium on Artificial Neural Networks, pages 227-232. d-side publications, 2008.
- Alexander Hasenfuss, Barbara Hammer, Tina Geweniger, and Thomas Villmann. Magnification control in relational neural gas. In M. Verleysen, editor, European Symposium on Artificial Neural Networks, pages 325-330. d-side publications, 2008.
- Banchar Arnonkijpanich, Barbara Hammer, Alexander Hasenfuss, and Chidchanok Lursinsap. Matrix learning for topographic neural maps. In Vera Kurkova, Roman Neruda, and Jan Koutnik, editors, ICANN (1), volume 5163 of Lecture Notes in Computer Science, pages 572-582. Springer, 2008.
- Marc Strickert, Nese Sreenivasulu, Thomas Villmann, and Barbara Hammer. Robust centroid-based clustering using derivatives of pearson correlation. In Pedro Encarnacao and Antonio Veloso, editors, BIOSIGNALS (2), pages 197-203. INSTICC - Institute for Systems and Technologies of Information, Control and Communication, 2008.
- Alexander Hasenfuss and Barbara Hammer. Single pass clustering and classification of large dissimilarity datasets. In Bhanu Prasad, Pawan Sinha, Ashwin Ram, and Etienne E. Kerre, editors, Artificial Intelligence and Pattern Recognition, pages 219-223. ISRST, 2008.
- Alexander Hasenfuss, Barbara Hammer, and Fabrice Rossi. Patch relational neural gas - clustering of huge dissimilarity datasets. In Lionel Prevost, Simone Marinai, and Friedhelm Schwenker, editors, Artificial Neural Networks in Pattern Recognition, Third IAPR Workshop, ANNPR 2008, Paris, France, July 2-4, 2008, Proceedings, volume 5064 of Lecture Notes in Computer Science, pages 1-12. Springer, 2008.
- Marc Strickert, P. Schneider, Jens Keilwagen, Thomas Villmann, Michael Biehl, and Barbara Hammer. Discriminatory data mapping by matrix-based supervised learning metrics. In Lionel Prevost, Simone Marinai, and Friedhelm Schwenker, editors, Artificial Neural Networks in Pattern Recognition, Third IAPR Workshop, ANNPR 2008, Paris, France, July 2-4, 2008, Proceedings, volume 5064 of Lecture Notes in Computer Science, pages 78-89. Springer, 2008.

- F.-M. Schleif, T. Villmann, and B. Hammer. Analysis of proteomic spectral data by multiresolution analysis and self-organizing maps. In F. Masulli, A. Mitra, and G. Pasi, editors, *Application of Fuzzy Sets Theory - Proc. of the 7th International Workshop on Fuzzy Logic and Applications WILF 2007*, Camagoli, Italy, LNAI 4578, pages 563-570, Berlin, 2007. Springer. ISBN 978-3-540-73399-7.
- Fabrice Rossi, Alexander Hasenfuss, and Barbara Hammer. Accelerating relational clustering algorithms with sparse prototype representation. In *Proceedings of 6th International Workshop on Self-Organizing Maps (WSOM 2007)*, Bielefeld, Germany, September 3-6, 2007, 2007.
- Barbara Hammer, Alexander Hasenfuss, Fabrice Rossi, and Marc Strickert. Topographic processing of relational data. In *Proceedings of 6th International Workshop on Self-Organizing Maps (WSOM 2007)*, Bielefeld, Germany, September 3-6, 2007, 2007.
- Petra Schneider, Michael Biehl, Frank-Michael Schleif, and Barbara Hammer. Advanced metric adaptation in generalized LVQ for classification of mass spectrometry data. In *Proceedings of 6th International Workshop on Self-Organizing Maps (WSOM 2007)*, Bielefeld, Germany, September 3-6, 2007, 2007.
- Aree Witoelar, Michael Biehl, and Barbara Hammer. Learning vector quantization: generalization ability and dynamics of competing prototypes. In *Proceedings of 6th International Workshop on Self-Organizing Maps (WSOM 2007)*, Bielefeld, Germany, September 3-6, 2007, 2007.
- Thomas Villmann, F.-M. Schleif, E. Merenyi, M. Strickert, and B. Hammer. Class imaging of hyperspectral satellite remote sensing data using FLSOM. In *Proceedings of 6th International Workshop on Self-Organizing Maps (WSOM 2007)*, Bielefeld, Germany, September 3-6, 2007, 2007.
- Nikolai Alex, Barbara Hammer, and Frank Klawonn. Single pass clustering for large data sets. In *Proceedings of 6th International Workshop on Self-Organizing Maps (WSOM 2007)*, Bielefeld, Germany, September 3-6, 2007, 2007.
- A. Hasenfuss and B. Hammer. Relational topographic maps. In Michael R. Berthold, John Shawe-Taylor, and Nada Lavrac, editors, *Advances in Intelligent Data Analysis VII, Proceedings of the 7th International Symposium on Intelligent Data Analysis, IDA 2007*, Ljubljana, Slovenia, September 6-8, 2007, volume 4723 of *Lecture Notes in Computer Science*, pages 93-105, Berlin, 2007. Springer.
- B. Hammer and A. Hasenfuss. Relational neural gas. In J. Hertzberg, M. Beetz, and R. Englert, editors, *KI 2007: Advances in Artificial Intelligence, 30th Annual German Conference on AI, KI 2007*, volume 4667 of *Lecture Notes in Artificial Intelligence*, pages 190-204, Berlin, 2007. Springer.
- Frank-M. Schleif, T. Villmann, and B Hammer. Supervised neural gas for functional data and its application to the analysis of clinical proteom spectra. In F. Sandoval, A. Prieto, J. Cabestany, and M. Grana, editors, *Computational and Ambient Intelligence - Proceedings of the 9th Work-conference on Artificial Neural Networks (IWANN)*, San Sebastian (Spain), LNCS 4507, pages 1036-1004, Berlin, 2007. Springer.
- A. Hasenfuss, B. Hammer, F.-M. Schleif, and T. Villmann. Neural gas clustering for dissimilarity data with continuous prototypes. In F. Sandoval, A. Prieto, J. Cabestany, and M. Grana, editors, *Computational and Ambient Intelligence - Proceedings of the 9th Workconference on Artificial Neural Networks (IWANN)*, San Sebastian (Spain), LNCS 4507, pages 539-546, Berlin, 2007. Springer.
- T. Villmann, Frank-M. Schleif, E. Merenyi, and B. Hammer. Fuzzy labeled self organizing map for clasification of spectra. In F. Sandoval, A. Prieto, J. Cabestany, and M. Grana, editors, *Computational and Ambient Intelligence - Proceedings of the 9th Work-conference on Artificial Neural Networks (IWANN)*, San Sebastian (Spain), LNCS 4507, pages 556-563, Berlin, 2007. Springer.

- B. Hammer, A. Hasenfuss, F.-M. Schleif, Th. Villmann, M. Strickert, and U. Seiffert. Intuitive clustering of biological data. In Proceedings of International Joint Conference on Neural Networks (IJCNN 2007), Orlando, Florida, USA, August 12-17, 2007, 2007.
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