

# Bert de Vries

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## Principal Interests

Signal processing, machine learning, computational neuroscience, biomedical engineering, research management, technical writing; applications to multimedia processing, medical devices, hearing rehabilitation and clinical trial design/analysis.

## Academic Background

**12/91, Ph.D. Electrical Engineering, University of Florida** Gainesville, FL  
Ph.D. research in signal processing under direction of Professor Jose C. Principe. Dissertation title: *Temporal processing with neural networks—the development of the gamma model*.

**12/86, M.E. Electrical Engineering, Technical University Eindhoven**  
Eindhoven, the Netherlands  
Focus areas: medical (thesis: intelligent alarms during anaesthesia) and digital communications engineering.

## Employment History

**'12-pres., Professor, Eindhoven University of Technology, Signal Processing Systems Group, EE dept.** Eindhoven, the Netherlands

- 1 day/week appointment; Previous engagement: Research Fellow ('04-'11)
- Research on **Personalization of Medical Signal Processing Systems**
- Teach graduate class on Adaptive Information Processing.
- Inaugural lecture: "In Situ Personalization of Signal Processing Systems" (at youtube), September 2013.

**'99-pres., Principal Scientist, GN ReSound (Philips Hearing Technologies until 2001)** Eindhoven, the Netherlands

- Other engagements include: DSP Functional Leader ('11-pres.), Head DSP Research ('08-'11), Manager External Research ('01-'08), Technology Leader ('99-'01, Philips)
- Research PI on low-power signal processing technology for the next generation of digital hearing aids.
- Leadership/management tasks include(d) all aspects of team and project management (teams of about 10 engineers); (responsible for) the corporate DSP research track, including the roadmap, budget and management; initiating and managing key studies at academic institutions and contract research organizations.

**'93-'99, Member Technical Staff, Sarnoff Corporation** Princeton, NJ

- Research in advanced signal processing algorithms, initiating new technical and commercial thrusts, technical proposal writing and project management.
- Principal investigator of funded projects on keyword spotting, digital hearing aids signal processing, speech enhancement and noise-robust speech recognition (co-PI).
- Co-initiated and developed signal processing in financial markets program at Sarnoff.

- Member medical image processing research team. Funded projects include blind signal processing for breast mammography and perceptually optimized image coding.

**'92-'93, Postdoctoral Fellow, David Sarnoff Research Center**      Princeton, NJ

- Developed neural network based speech recognition method (50% error reduction relative to competing methods).

**'87-'91, Research/Teaching Assistant, University of Florida**      Gainesville, FL

- Taught and assisted in graduate classes in digital signal processing, control theory and computer architecture.

## Awards

### Special Achievements

- Return-on-Performance Award, for technical work on Speech Enhancement technology, Sarnoff Corporation, 1998
- Achievement Award, for "Leadership and technical contributions in the area of adaptive speech enhancement", Sarnoff Corporation, 1997
- David Sarnoff Event Focus Award for "Winning Sarnoff's First Commercial Contract for Speech Processing", David Sarnoff Research Center, 1996.
- Presidential Recognition Award, University of Florida, 1988.
- $\delta$ -Butterweck Award (awards top GPA), Technical University Eindhoven, 1984.

## Invited Lectures (selection)

- Leiden University Medical Center, keynote lecture on "Personalization of Medical Signal Processing Systems ", Leiden, January 2014
- Int'l Symposium on Auditory and Audiological Research (ISAAR), "Is Hearing Aid Signal Processing ready for Machine Learning", Nyborg (DK), August 2013
- Clinical Physicist Post-graduate school, "The Future of Hearing Aids", Amersfoort January 2013
- Delft Univ. of Technology, "Machine Learning for Hearing Aids Technology", Delft March 2012
- International Forum for Hearing Instrument Developers, "Bayesian Machine Learning for Hearing Aid Design, Fitting and Personalization", Oldenburg (Germany), June 2011
- University of Florida, "Machine Learning Trends in the Hearing Aids Industry", Gainesville, FL, April 2010
- SIKS Research School, "Gaussian mixture models and the EM Algorithm", Vught, Dec 2008
- GN Nordic Audiology College, "Learning technology in hearing aids", Oslo, Norway, Sep 29, 2006
- University of Nijmegen, "Machine learning for hearing aids", Nijmegen, Netherlands, June 2004
- University of Florida, "DSP for modern industrial hearing aids", Gainesville, FL, January 2004
- International Forum for Hearing Aid Developers "Warped-frequency filterbanks", Oldenburg, Germany, July 2003
- Keynote address "An industrial perspective on intelligent hearing aids" at 2nd McMaster-Gennum Workshop on Intelligent Hearing Instruments, Niagara-on-the-Lake, ON, Sep 2001

- NIDCA/NASA/VA Hearing Aids Improvement Conference, May 1997
- Lucent Technologies, Bell Laboratories, November 1996
- AT&T Research, July 1996
- NSA (U.S. Government), June 1993
- Neural Network Workshop, Rutgers University, October 1992
- David Sarnoff Research Center, October 1991

### Professional Activities (selection)

- Associate Editor for IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2012 - pres.
- Invited member annual European Mathworks Advisory Board meetings, 2012 - pres.
- Invited jury member for Open Technology Program (OTP) research proposals to Dutch Technology Foundation STW, Dec. 2010
- Invited DSP expert on IWT (Flemish Institute for Science and Technology) panel to evaluate candidate PhD proposals, Brussels, Nov. 2005 and May 2006
- Organizer/chair special session ‘DSP for Intelligent Hearing Aids’, ICASSP 2002, Orlando, FL, May 2002
- Publicity chair, Neural Networks for Signal Processing Workshop, Amelia island, Florida, 1997 and Cambridge, UK, 1998
- Session chair Non-linear Systems Identification, ICASSP96, Atlanta, GA, May 1996, and IEEE NNSP-98 Workshop, Cambridge, UK, September 1998
- (Elected) member of "IEEE Technical Committee on Neural Networks for Signal Processing Society", 1995-1998
- Invited researcher in government sponsored Robust Speech Processing Workshop, July-August 1993
- Member of various professional societies (e.g. IEEE, INNS)

### Refereed Publications

IEEE Transactions on Signal Processing, IEEE Transactions on Neural Networks, Neuro-Computing Journal, Neural Networks Journal, EURASIP Journal of Applied Signal Processing, Advances in Neural Information Processing Systems (NIPS) Conferences, ICASSP Conferences and others.

### TU/e Univ. Activities

#### Teaching

- **Adaptive Information Processing.** Together with Tjalling Tjalkens, since spring 2005 I teach a core graduate class on the fundamentals of machine learning.
- **Machine Learning.** I organized a machine learning reading club for TU/e graduate students and GN ReSound staff. Fall 2004.

#### Research

My current research focuses on applications of Bayesian machine learning to personalization of hearing aid algorithms. In July 2006, together with Tom Heskes and Wouter Dreschler, we received a 650K euro grant from STW to pursue further research on *Personalization of Hearing Aids through Bayesian Preference Elicitation*.

#### Recent Student Supervision

- Brian Hutama Susilo, M.Sc. practical training project, *Automated Tuning Algorithm for Low-latency PC-based Audio Processing*, Dec. 2013
- Zijian Xu, M.Sc. thesis project, *Fast Design of Audio Processing Algorithms by Interactive Parameter Exploration*, August 2013
- Timur Bagautdinov, M.Sc. thesis project, *A Machine Learning Framework for Signal Processing*, August 2013
- Marno van der Maas, B.Sc. research project, *Browser-based Remote Control of Hearing Aids*, June 2013
- Maarten Thomassen, M.Sc. practical training project, *Spectral Audio Monitoring*, July 2012
- Joris Kraak, M.Sc.-thesis, *Computer-Aided Algorithm Design for Audio Processing*, April 2012
- Joris Kraak, M.Sc. practical training project, *Optimization of a Spectral Noise Tracking Algorithm*, Dec. 2010
- Jianfeng Li, M.Sc.-thesis, *Acoustic scene-adaptive speech enhancement*, Aug. 2010
- Jianfeng Li, M.Sc.-project, *Spatial defect clustering on semiconductor wafers using image processing techniques*, Aug.-2009
- Xueru Zhang, P.D.Eng.-thesis: *Bayesian periodogram smoothing for speech enhancement*, Sep. 2008
- Rene Besseling, M.Sc.-project, *Gaussian processes in Bekesy audiometry*, June 2008
- Serkan Ozer, M.Sc.-thesis: *Bayesian linear regression for user-adaptive hearing aids*, Aug. 2007
- Ronnie van Loon, M.Sc.-thesis: *a Probabilistic Approach to Sound Classification*, June 2007.
- Anton Vakrushev, P.D.Eng.-thesis: *Interactive machine learning for Personalization of hearing aid algorithms*, Sep. 2006
- Jorik Caljouw, M.Sc. practical training on *PDA-based Interfacing to a real-time audio platform*, Dec. 2005.
- Paul Aelen, M.Sc. project, *Determination of the Intra Uterine Pressure with electrodes on the abdomen*, Dec. 2005.
- Job Geurts, M.Sc. practical training on *A PC-based real-time simulation platform for evaluating hearing aid algorithms*, Jun. 2005.

### Care and Cure theme

I actively participated in the development of the Care and Cure theme roadmap for the EE department (2008).

### Personal

Born on June 28th 1962. Dutch citizen. Leisure interests: sports, travel and reading.

### References

Dr. Jose C. Principe, Distinguished Professor of Electrical Engineering, (Ph.D. supervisor).  
University of Florida, Gainesville, FL  
e-mail [principe@synapse.ee.ufl.edu](mailto:principe@synapse.ee.ufl.edu)

Other references on request.

### Publications

#### Impact Factor

- 10 journal articles, 13 patents, >50 conference contributions with citation numbers (high to low) 146, 108, 69, 33, 33, 31, 30, 29, 21, 16, 14, 12, 11, 11, 10, 7, 7, ...  $\Rightarrow$  Hirsch-index = 12, Google Scholar, Feb-2011.
- (>60 unpublished technical reports (company confidential))

## Journal Articles and Book Chapters

11. Rik Vullings et al. An Adaptive Kalman Filter for ECG Signal Enhancement, *IEEE Transactions on Biomedical Engineering*, vol.58, no.4, April 2011.
10. A. Ypma et al., On-line Personalization of Hearing Instruments, *EURASIP Journal on Audio, Speech, and Music Processing*, September 2008.
9. Tjeerd Dijkstra et al., The Learning Hearing Aid: Common-Sense Reasoning in Hearing Aid Circuits, *The Hearing Review*, issue October 2007. (cited by 5, GS1102 (=Google Scholar, 2011-02))
8. David Zhao et al., On-line Noise Estimation Using Stochastic-Gain HMM for Speech Enhancement, *IEEE Transactions on Audio, Speech and Language Processing*, vol.16, no.4, May 2008. (cited by 2, GS0808)
7. Jose Principe et al., Locally Recurrent Networks: The Gamma Operator, Properties and Extensions, invited book chapter in *Neural Networks and Pattern Recognition*, Omidvar and Dayhoff (eds.), Academic Press, 1997. (cited by 1, GS0907)
6. Bert de Vries, Short term memory structures for dynamic neural networks, book chapter in: *Artificial Neural Networks for Speech and Vision*, Richard Mammone (ed.), Chapman & Hall Ltd., 1994. (cited by 3, GS0810)
5. Bert de Vries and Jose Principe, The gamma model—A new neural network for temporal processing, *Neural Networks* vol. 5(4), pp. 565-576, 1992. (cited by 146, GS1102)
4. Jose Principe and Bert de Vries, The gamma filter—A new class of adaptive IIR filters with restricted feedback, *IEEE transactions on signal processing* vol. 41(2), pp. 649-656, 1992. (cited by 108, GS1102)
3. Bert de Vries, Temporal processing with neural networks—the development of the Gamma model, *Ph.D. dissertation*, University of Florida, 1991. (cited by 12, GS1102)
2. Joachim Gravenstein et al., Sampling intervals for clinical monitoring of variables during anesthesia, *Journal of clinical monitoring* vol 5(1), 1989. (cited by 30, GS1102)
1. Jan J. van der Aa, Bert de Vries and Joachim Gravenstein, Toward more sophisticated monitoring alarms, *Journal of clinical monitoring* 4 (2), 1986.

## Patents

15. Andrew Dittberner et al., A Location Learning Hearing Aid, filed by GN ReSound with Danish Patent and Trademark Office, December 2013
14. Bert de Vries and Mojtaba Farmani, A Hearing Aid with Probabilistic Hearing Loss Compensation, filed by GN ReSound with US Patent and Trademark Office, App. number 14077031, Nov. 2013
13. Bert de Vries et al., Efficient evaluation of hearing ability, submitted by GNR Ref.: P1669 EP, Albihs Ref.: P13304 US / P13303, April 2009.
12. Alexander Ypma et al., Asymmetric synchronization of hearing aid algorithms, submitted by GN ReSound, patent no. 09174982.0-2225, filed 4-Nov-2009.
11. Alexander Ypma et al., Learning control of hearing aid parameter settings, submitted by GN ReSound, filed 16-Mar-2007.

10. Bert de Vries and Alexander Ypma, Optimization of Hearing Aid Parameters, filed by GN ReSound, patent no. WO/2007/042043, 10/13/06.
9. Bert de Vries, Bastiaan Kleijn, Alexander Ypma and David Zhao, Method and Apparatus for Improved Estimation of Non-stationary Noise for Speech Enhancement, filed by GN ReSound, patent no. 06119399.1-224, 08/23/06
8. Bert de Vries and Rob de Vries, Fitting methodology and hearing prosthesis based on signal-to-noise ratio loss data, USA patent registered for GN ReSound, no. 20040047474, 03/11/2004.
7. L. Parra and B. de Vries, Method and apparatus for adaptive speech detection by applying a probabilistic description to the classification and tracking of signal components, patent registered for Sarnoff Corporation, LG Electronics, Inc., no. 6691087, 10-Feb. 2004. (cited by 3, GS1102)
6. Bert de Vries, Noise Spectrum Tracking for Speech Enhancement, patent registered for Sarnoff Corporation, no. US6289309, 9/11/2001. (cited by 29, GS1102)
5. J. Lubin et al., Method and apparatus for training a neural network to learn and use fidelity metric as a control mechanism, patent registered for Sarnoff Corporation, no. US6075884, 6/13/2000. (cited by 14, GS1102)
4. Bert de Vries, Method and apparatus for filtering signals using a gamma delay line based estimation of power spectrum, patent registered for Sarnoff Corporation, no. US6073152, 6/6/2000. (cited by 1, GS1102)
3. M. Brill, J. Lubin, B. de Vries, O. Finard, Method and apparatus for assessing the visibility of differences between two image sequences, patent registered for Sarnoff Corporation, no. US5974159, 10/26/1999. (cited by 33, GS1102)
2. Bert de Vries, Method and system for training a neural network with adaptive weight updating and adaptive pruning in principal components space, patent registered for David Sarnoff Research Center, no. 5,812,992, 9/22/98. (cited by 21, GS1102)
1. Bert de Vries and Jose Principe, An adaptive filter based on a recursive delay line, patent registered for University of Florida, no. 5,301,135, April 1994. (cited by 5, GS1102)

## Conferences and Workshops

55. Bert de Vries and Andrew Dittberner, Is Hearing Aid Signal Processing Ready for Machine Learning? *Int'l Symposium on Auditory and Audiological Research*, Nyborg, DK, Aug. 2013
54. Ungureanu C. et al., A Bayesian Network for Detection of Seizures, *1st Jan Beneken Conference on Modeling and Simulation of Human Physiology*, Eindhoven, NL, 2013
53. Petkov P. et al., Discrete Choice Models for Non-Intrusive Quality Assessment, *Interspeech 2011*, Florence, Italy, 2011
52. Rob de Vries et al., A software suite for automatic beamforming calibration, *Int'l Hearing Aid Research Conference*, Lake Tahoe, CA, August 2010
51. S.I. Mossavat et al., A Bayesian hierarchical mixture of experts approach to estimate speech quality, *QoMEX 2010*, Trondheim, Norway, June 2010
50. Jos Leenen and Bert de Vries, Current DSP and Machine Learning Trends in the Hearing Aids Industry, *IEEE Benelux Signal Processing Symposium: Signal Processing for Digital Hearing Aids*, Delft, NL, April 2010
49. Xueru Zhang et al., Bayesian periodogram smoothing for speech enhancement, *European Symposium on Artificial Neural Networks (ESANN-09)*, Bruges, April 2009

48. Adriana Birlutiu et al., Towards hearing aid personalization: preference elicitation from audiological data, *Scientific ICT-Research Event Netherlands (SIREN)*, Amsterdam, Sep. 2008
47. Tjeerd Dijkstra et al., HearClip: an Application of Bayesian Machine Learning to Personalization of Hearing Aids, Presentation at *Dutch Society for Audiology Meeting*, Sep. 2008
46. Bert de Vries, Fast Model-Based Fitting through Active Data Selection, *Int'l Hearing Aid Research Conference*, Lake Tahoe, CA, August 2008
45. Rolph Houben et al., Construction of a virtual subject response database to reduce subject testing, *Int'l Hearing Aid Research Conference*, Lake Tahoe, CA, August 2008
44. Bert de Vries et al., The Complexity of Hearing Aid Fitting, presented at *International Symposium on Auditory and Audiological Research 2007*, Helsingor, Denmark, August 2007
43. Jos Leenen et al., Learning Volume Control for Hearing Aids, presented at *International Symposium on Auditory and Audiological Research 2007*, Helsingor, Denmark, August 2007
42. Alexander Ypma et al., Bayesian Feature Selection for Hearing Aid Personalization, *MLSP-07*, Thessaloniki, Greece, 2007. (cited by 2, GS1102)
41. Adriana Birlutiu et al., Personalization of Hearing Aids through Bayesian Preference Elicitation, *NIPS workshop on User Adaptive Systems*, Whistler, BC, Canada, December 2006
40. Bert de Vries et al., Bayesian Machine Learning for Personalization of Hearing Aid Algorithms, *Int'l Hearing Aid Research Conference*, Lake Tahoe, CA, August 2006
39. Alexander Ypma, Bert de Vries and Job Geurts, Robust Volume Control Personalization from On-line Preference Feedback, *IEEE Int. Workshop on Machine Learning for Signal Processing*, Maynooth, Ireland, 2006. (cited by 4, GS1102)
38. Bert de Vries, Tom M. Heskes and Tjeerd M. H. Dijkstra, Bayesian Incremental Utility Elicitation with Application to Hearing Aids Personalization, *Valencia/ISBA 8th World Meeting on Bayesian Statistics*, Benidorm, Spain, June 2006
37. Tjeerd M. H. Dijkstra et al., A Bayesian decision-theoretic framework for psychophysics, *Valencia/ISBA 8th World Meeting on Bayesian Statistics*, Benidorm, Spain, June 2006
36. Alexander Ypma, Bert de Vries and Job Geurts, A learning volume control that is robust to user inconsistency, *The second annual IEEE BENELUX/DSP Valley Signal Processing Symposium*, Antwerp, March 2006
35. Paul Aelen et al., Electrohysterographic Estimation of the Intra-Uterine Pressure, *The second annual IEEE BENELUX/DSP Valley Signal Processing Symposium*, Antwerp, March 2006
34. Tom Heskes and Bert de Vries, Incremental Utility Elicitation for Adaptive Personalization, *The 17th Belgian-Dutch Conference on Artificial Intelligence*, Brussels, Belgium, October 2005. (cited by 6, GS1102)
33. Bert de Vries and Rob de Vries, An Integrated Approach to Hearing Aid Algorithm Design, *Int'l Hearing Aid Research Conference*, Lake Tahoe, CA, August 2004
32. Harald Pobloth et al., Speech Coding for Wireless Communication in the Hearing Aid Environment, *Int'l Hearing Aid Research Conference*, Lake Tahoe, CA, August 2004
31. Bert de Vries and Rob de Vries, An Integrated Approach to Hearing Aid Algorithm Design for Enhancement of Audibility, Intelligibility and Comfort, *IEEE Benelux Signal Processing Symposium*, Hilvarenbeek, Netherlands, April 2004. (cited by 4, GS1102)



30. Rob de Vries and Bert de Vries, Toward SNR-Loss Restoration in Digital Hearing Aids, *ICASSP 2002*, Orlando, FL, May 2002. (cited by 4, GS0801)
29. Bert de Vries, Jos Leenen, A Low Power Digital AGC Circuit for Dynamic Range Control of an A/D Converter, *International Hearing Aids Research (IHCON) Conference 2000*, Lake Tahoe (CA), August 2000
28. Lucas Parra, Clay Spence and Bert de Vries, Convolutional Blind Source Separation based on Multiple Decorrelation, *IEEE workshop on Neural Networks for Signal Processing VIII*, pp.23-32, Cambridge, UK, 1998. (cited by 69, GS1102)
27. Bert de Vries, Blind Signal Processing for Hearing Aids, *NIH Hearing Aids Improvement Conference*, Bethesda, MA, May 1997
26. Bert de Vries, Adaptive Gamma Filters for Miniature Hearing Aids, *NIH Hearing Aids Improvement Conference*, Bethesda, MA, May 1997
25. Bert de Vries, Adaptive rank filtering based on error minimization, *ICASSP-97*, Munich, April 1997
24. Lucas Parra, Clay Spence, Bert De Vries, Convolutional Source Separation and Signal Modeling with Maximum Likelihood, *International Symposium on Intelligent Systems (ISIS'97)*, 1997, Reggio Calabria, Italy. (cited by 10, GS1101)
23. Q. Lin et al., Robust distant-talking speech recognition, *ICASSP-96*, Atlanta, GA, May 1996. (cited by 16, GS1102)
22. Bert de Vries et al., Neural network speech enhancement for noise robust speech recognition, *International Workshop on Applications of Neural Networks to Telecommunications*, Sweden, May 1995. (cited by 2, GS1102)
21. Lin et al., Experiments on distant-talking speech recognition, *ARPA Workshop on Spoken Language Technology*, Austin, TX, January 1995. (cited by 11, GS1102)
20. Qiguang Lin et al., System of microphone arrays and neural networks for robust speech recognition in multimedia environments, *Proceedings International Conference on Spoken Language Processing*, Yokohama, Japan, September 1994. (cited by 8, GS1102)
19. Bert de Vries, Gradient-based adaptation of network structure, *International Conference on Artificial Neural Networks 94*, Sorrento, Italy, May 94.
18. Che et al., Microphone Arrays and Neural Networks for Robust Speech Recognition, *ARPA Workshop on Human Language Technology*, Princeton, NJ, March 1994. (cited by 33, GS1102)
17. Bert de Vries et al., An application of Gamma delay lines to "BDG" phoneme classification, *Government Microcircuit Applications Conference proceedings*, New Orleans, LA, November 1993.
16. Bert de Vries, Time-varying neural networks for large tasks, *International Conference on Artificial Neural Networks proceedings*, Amsterdam, the Netherlands, September 13-16, 1993.
15. J.C. Principe et al., Backpropagation through time with fixed memory size requirements, *Proceedings of Workshop on Neural Networks for Signal Processing*, Linthicum Heights, MD, USA, Sep. 1993. (cited by 1, GS1102)
14. Bert de Vries et al., Learning with target trajectory constraints for sequence classification tasks, *ICASSP-93*, Minneapolis, MN, April 1993.
13. Bert de Vries et al., Short Term Memory Structures for Dynamic Neural Networks, *Asilomar-92 Conference proceedings*, Pacific Grove, CA, 1992. (cited by 3, GS1102)
12. T. Oliveira a Silva et al., Generalized feedforward filters with complex poles, *Proceedings of the 1992 IEEE workshop on Neural Networks for Signal Processing*, Copenhagen, Denmark, 1992.



11. Jyh-Ming Kuo, Jose Principe and Bert de Vries, Prediction of chaotic time series using recurrent networks, *Proc. of the 1992 IEEE workshop on Neural Networks for Signal Processing*, 1992. (cited by 7, GS1102)
10. Jose Principe, Bert de Vries and Pedro G. de Oliveira, Generalized feedforward structures: a new class of adaptive filters, *ICASSP-92*, San Francisco, vol. IV, pp. 245-248, 1992. (cited by 7, GS0801)
9. T. Oliveira e Silva, P. Guedes de Oliveira, J. C. Principe and B. de Vries, A Complex Pole Extension to the Gamma Filter, *The INESC Journal of Research and Development*, vol. 3, no. 1, pp. 35-41, Jan./Jun. 1992.
8. Bert de Vries et al., Adaline with adaptive recursive memory, *Proceedings IEEE workshop on signal processing*, Princeton, NJ, 1991. (cited by 11, GS1102)
7. Principe et al., Modeling applications with the focused gamma net, *NIPS-4 proceedings*, Denver, CO, 1992. (cited by 6, GS0810)
6. Bert de Vries et al., Some practical issues concerning the gamma neural net, *Proceedings IJCNN-91*, Seattle, WA, 1991.
5. Bert de Vries and Jose Principe, A theory for neural nets with time delays, *NIPS-3 Proceedings*, Denver, 1991. (cited by 31, GS1102)
4. Bert de Vries et al., Neural net models for temporal processing, *Proceedings ninth southern biom. eng. conference*, Miami, FL, 1991.
3. Bert de Vries et al., A new neural net model for temporal processing, *12th ann. int. conf. IEEE on the eng. in medicine and biology society*, Philadelphia, PA, 1990.
2. Bert de Vries et al., Artificial neural networks as a computational paradigm for detection of anaesthetic complications, *Computers in Anesthesia 10*, New Orleans, LA, 1989.
1. Bert de Vries et al., Distribution of anesthesia related occurrences during surgical operations, *Anesthesiology review* 14 (6), 1987.