Bert de Vries

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PRINCIPAL INTERESTS

Nature-inspired artificial intelligence and (Bayesian) machine learning, signal processing, computational neuroscience, research management, technical writing; typical applications to multimedia processing, robotics, and medical devices.

ACADEMIC BACKGROUND

PhD Electrical Engineering 1991
University of Florida, Gainesville, FL

- PhD research in signal processing under direction of prof. Jose C. Principe. Dissertation title: Temporal processing with neural networks–the development of the gamma model.

MSc Electrical Engineering 1986
Eindhoven University of Technology (TU/e), Eindhoven, the Netherlands

- Focus areas: medical engineering (thesis: intelligent alarms during anesthesia) and digital communications.

EMPLOYMENT HISTORY

Full Professor 2012 - Present
Eindhoven University of Technology, EE dept., BIASlab, Eindhoven, Netherlands

- History: research fellow 2005-2012; part-time professor (1 day/wk) 2012 to Sep-2021; full-time professor since Sep-2021
- Founder/director BIASlab research laboratory, 2012 - present
- Co-founder start-up Lazy Dynamics BV, 2023
- Research on Natural Artificial Intelligence, 2012 - present
- Teach graduate class on Bayesian Machine Learning and Information Processing, 2005 - present
- Inaugural lecture: In Situ Personalization of Signal Processing Systems; lecture at youtube, 2013

Principal Scientist 1999 - Present
GN Hearing (Philips Hearing Technologies until 2001), Eindhoven, Netherlands

- full-time 1999 to Sep-2021, part-time since Sep 2021
- 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
- Other engagements at GN include(d): Technology Leader ('99-'01, Philips), Manager External Research ('01-'08), Head DSP Research ('08-'11), DSP Functional Leader ('11-'14), Key Opinion Leader ('14-'20)

Member Technical Staff 1992 - 1999
SRI International (previously 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
- Other engagements at SRI included: Postdoctoral fellow ('92-'93)

AWARDS

- *TU/e EE dept. Innovation Research Award* (150K euro) for "research on Bayesian Intelligent Agents", TU Eindhoven, EE department, Jan. 2019
- *Return-on-Performance Award*, for "technical work on Speech Enhancement technology", Sarnoff Corporation, 1998
- *David Sarnoff 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
- *δ-Butterweck Award* (awards top GPA), Technical University Eindhoven, 1984

RESEARCH FUNDING

Research at TU/e focuses on nature-inspired artificial intelligence agents.

- $\sim$ 1M euro (2023-2027), together with Jaap Ham, supporting 3 PhD and 2 PDEng students, from NWO for research on Trustworthy AI in the context of the ROBUST project.
- $\sim$ 1M euro (2022-2025), financial support for 4 PhD students by GN Hearing and TU Eindhoven in the context of a "mini-impulse" research program on *Automated Design of Augmented Hearing Reality Algorithms.*
- 450K EUR (2021-2025), funded by TU/e EAISI institute. Together with Burcu Gumuscu Sefunc, Robert Peharz, Wouter Kouw and Regina Luttge, to support 2 PhD students for research on *BayesBrain: The World's First Brain-on-Chip AI computer.*
- $\sim$ 1M euro (2018-2022), financial support for 4 PhD students by GN Hearing and TU Eindhoven in the context of a "mini-impulse" research program on *collaborative hearing.*
- 750K euro (2018-2022), together with Henkjan Huisman and Henk Corporaal to support 3 PhD students, from NWO for research on *deep learning for human and animal health*, in the context of Efficient Deep Learning.
- 550K euro (2017-2021), together with Sander Stuijk and Henk Corporaal, supporting 3 PhD students, from NWO to pursue research on *Autonomous Acoustic Systems* in the context of energy-autonomous systems for IoT.
- 500K euro (2015-2019), together with Tjalling Tjalkens, supporting 2 PhD students, from Dutch Technology Foundation STW to pursue research on Data-driven Hearing Aids.

- 500K euro (2014-2018), supporting 2 PhD students at TU/e, from GN ReSound to support research on hearing aids personalization.
- 130K euro (2006-2008) from GN ReSound to support 2 PDEng students at TU/e.
- 650K euro (2006-2010), together with Tom Heskes and Wouter Dreschler, from STW to pursue further research on Personalization of Hearing Aids through Bayesian Preference Elicitation.

PROFESSIONAL SERVICE

- 2023/9 co-organizer of special session on "Efficient Bayesian Methods for Signal Processing", at 33rd IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2023), Rome, Italy
- 2023/8 Scientific Committee member for the 4th Clarity Workshop on Machine Learning Challenges for Hearing Aids (Clarity-2023), Dublin, Ireland
- 2023/6 Co-chair Special Session on "Machine Learning for Hearing Aid Devices", Hearing Aids Developer Forum (HDAF), Oldenburg, Germany
- 2021 - present, Scientific Board member, NWO Long-Term Program "ROBUST: Trustworthy AI-based Systems for Sustainable Growth"
- 2021/9 - 2022/4 Program Leader, MSc Artificial Intelligence & Engineering Systems at TU Eindhoven
- 2017 - 2021, Chair User Committee NWO Perspective Program ZERO (P15-06)
- 2020 - 2022, Member program committee for "Artificial Intelligence: Methodology, Systems, Applications" (AIMSA-2020, 2022) conferences.
- 2020 - 2021, TU/e, Member sounding board MSc AI&ES.
- 2012 - 2018, Associate Editor for IEEE Transactions on Neural Systems and Rehabilitation Engineering
- 2012 - 2015, Invited member annual European Mathworks Advisory Board meetings,
- 2010, Invited jury member for Open Technology Program (OTP) research proposals to Dutch Technology Foundation (STW)
- 2005, 2006, Invited DSP expert on IWT (Flemish Institute for Science and Technology) panel to evaluate candidate PhD proposals, Brussels
- 2002, Organizer/chair special session "DSP for Intelligent Hearing Aids", ICASSP 2002, Orlando, FL
- 1997, 1998, Publicity chair, Neural Networks for Signal Processing Workshop, Amelia island, Florida (1997) and Cambridge, UK (1998)
- 1998, Session chair Non-linear Systems Identification, ICASSP-96, Atlanta, GA (1996) and IEEE NNSP-98 Workshop, Cambridge, UK
- 1995 - 1998, (Elected) member of "IEEE Technical Committee on Neural Networks for Signal Processing Society"
- 1993, Invited researcher in government sponsored "Robust Speech Processing Workshop"
- 1986 - present, Member of various professional societies (e.g. IEEE, INNS)

TEACHING

- *Bayesian Machine Learning and Information Processing (5SSD0)* 2020-present
  Graduate class on the fundamentals of Bayesian machine learning.
- *Adaptive Information Processing (5SSB0)* 2005-2019
  Together with dr. Tjalling Tjalkens, core graduate class on the fundamentals of machine learning.
- *Development of (Electro)-technology* 2011-2017
  Guest lecturer for introductory EE course

INVITED LECTURES (SELECTION)

- Signify symposium, *Natural Artificial Intelligence with Human-in-the-Loop*, Eindhoven, Sep 2023
- Intelligent Systems Conference (IntelliSys), *Natural Artificial Intelligence*, keynote presentation, Amsterdam, Sep 2023
- *Symposium Dauwels Lab, TU Delft*, invited speaker on "Natural Artificial Intelligence", Delft, April 2023
- *Symposium Synapse and Silicon*, "BayesBrain: the world's first hybrid brain-on-chip AI computer", Eindhoven, March 2023
- *Joint annual congress of NVA and B-Audio*, "Future Applications of AI Technology for Hearing Devices", Genk (BE), Nov. 2022
- Danish Sound Cluster Webinar on Personalization of User Needs, *A Bayesian Approch to Hearing Aid Personalization*, online presentation, June 2022
- *"Hot or Not" conference*, organized by Sioux Technologies, keynote on "The Future of AI Technology" (youtube video), Eindhoven, June 2021
- *Awesome IT 2021*, Nature-inspired AI for Automated Design of Signal Processing Systems, Amsterdam (online), April 2021
- *NVA (Dutch Institute for Audiology) winter meeting*, "The next ten years of AI for Hearing Device Design", Utrecht, Feb 2020
- *GN Hear More 2019* keynote, "Precision Audiology: how AI will affect the hearing care professional", Kuala Lumpur, Sep 2019
- AI Insight Talk at Google Amsterdam, "Automated Natural Design of Signal Processing Algorithms", Amsterdam, 17 May 2019
- Design, Automation and Test in Europe conference (DATE-2019), "Automated Signal Processing Design through Bayesian Model-based Machine Learning", Florence (Italy), 28 March 2019
- Annual conference Kring Klinische Audiologie, "In-situ Personalization of Hearing Devices", Putten (NL), Nov. 2017
- University College London (UCL), "A Factor Graph Approach to Active Inference", Nov. 2016
- Cochlear/ReSound Event, Keynote lecture on "The Future of Hearing Aid personalization", Sep.2016
- WIC Mid-winter meeting on 'Big Data and Data Analytics', "Design of Signal Processing Algorithms through Probabilistic Inference", Eindhoven, February 2016
- CQM (Consultants of Quantitative Methods), "In Situ Machine Learning for Signal Processing Systems", Eindhoven, August 2015
- Radboud University Nijmegen, "Probabilistic Hearing Loss Compensation", Nijmegen, March 2015

- INCAS3 Institute, "In Situ Personalization of Signal Processing Systems", Assen, October 2014
- Leiden University Medical Center, New Year's 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, NL, 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, Murray Hill, NJ, July 1996
- NSA (U.S. Government), June 1993
- Neural Network Workshop, Rutgers University, October 1992
- David Sarnoff Research Center, October 1991

MEDIA / INTERVIEWS

14. Hebben computerchips binnenkort allemaal levende hersencellen aan boord? Deze wetenschappers werken er aan, Interview with "Het Laatste Nieuws" (Belgian newspaper), Sep 2023
13. Het zuinige brein en de energieslurpende computer groeien naar elkaar, Trouw newspaper, 28 May 2022
12. BNR Eyeopeners podcast about organ-on-a-chip, podcast interview (in Dutch) with BNR Nieuwsradio, April 2022
11. Een computer van gekweekt hersenweefsel? De TU/e maakt er een, interview Eindhoven's Dagblad, April 2022

10. Hybride computer combineert hersencellen en computerchips, RTL nieuws, March 2022
9. Chasing The World's First Brain-on-Chip AI Computer, online magazine silicon semi-conductor article, March 2022
8. TU Eindhoven bouwt computer met levende hersencellen, article in "De Ingenieur", March 2022
7. TUE researchers to combine brain cells and microchips, interview in BITS & CHIPS magazine, March 2022
6. Menselijke hersencellen drijven computer aan, Computable magazine, March 2022
5. Chasing the world's first brain-on-chip AI computer, interview for TU Eindhoven cursor magazine, March 2022
4. Interview about Bayesian active learning in audiology, for Computational Audiology channel at YouTube, Jan 2022
3. Implementing Active Inference by Message Passing in a Factor Graph, ActInfLab ModelStream 004.1 (at youtube), Aug 2021
2. Slimme gehoorassistent, IO Magazine, Dec 2019
1. Introducing Data Science: Hearing Aids on the Brink of a Paradigm Shift]. Interview in Audiology Info Magazine, Dec 2014

PATENTS

22. Tanya Ignatenko, Kirill Kondrashov and Bert de Vries, *Fitting Agent for a Hearing Device and Method for Updating a Multi-Environment User Model*, filed by GN, PA202100638, June 2021
21. Bert de Vries, Andrew Dittberner and Joris Kraak, *Hearing System, Accessory Device and Related Method for Situated Design of Hearing Algorithms*, filed by GN, P2048EP00, Nov 2018
20. Bert de Vries, Marco Cox and Joris Kraak, *Hearing Device and Method for Tuning Hearing Device Parameters*, filed by GN, 2017P00065EP, Dec 2017
19. Almer van den Berg and Bert de Vries, *Sound signal modelling based on recorded object sound*, filed by GN ReSound, EP16206941.3, Dec. 2016
18. Bert de Vries and Joris Kraak, *Automated Scanning for Hearing Aid Parameters*, filed by GN ReSound, July 2016
17. Fredrik Gran et al., *Performance-based In Situ Optimization of Hearing Aids*, filed by GN ReSound, US-2017055090, priority date June 2015, pub date Dec 2016
16. Bert de Vries and Erik van der Werf, *A Multi-band Signal Processor for Digital Audio Signals*, filed by GN ReSound, US-2015317995, EP-2941020, priority date May 2014
15. Andrew Dittberner, Bert de Vries et al., *A Location Learning Hearing Aid*, filed by GN ReSound, JP-2015130659, US-2015172831, EP-2884766, priority date Dec. 2013
14. Bert de Vries and Mojtaba Farmani, *A Hearing Aid with Probabilistic Hearing Loss Compensation*, filed by GN ReSound, CN-105706466, EP-2871858, priority date Nov. 2013
13. Bert de Vries et al., *Efficient evaluation of hearing ability*, filed by GN ReSound, US Patent 9,560,991 (granted 2017), priority date April 2009

12. Alexander Ypma et al., *Asymmetric adjustment*, filed by GN ReSound, US patent 8792659 (granted 7/2014), priority date Nov-2008
11. Alexander Ypma et al., *Learning control of hearing aid parameter settings*, filed by GN ReSound, US patent 9408002 (granted 8/2016), priority date Mar-2006
10. Bert de Vries and Alexander Ypma, *Optimization of Hearing Aid Parameters*, filed by GN ReSound, US patent 9084066 (granted 7/2015), priority date Oct 2005
9. David Zhao, Bastiaan Kleijn, Alexander Ypma and Bert de Vries, *Method and Apparatus for Improved Estimation of Non-stationary Noise for Speech Enhancement*, filed by GN ReSound, US patent 7590530 (granted 8/2009), priority date Sep 2005
8. Bert de Vries and Rob de Vries, *Fitting methodology and hearing prosthesis based on signal-to-noise ratio loss data*, US patent 7804973 (granted 9/2010), priority date 2/2002
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., US patent 6691087 (granted Feb-2004), priority date Nov 1997
6. Bert de Vries, *Noise Spectrum Tracking for Speech Enhancement*, patent registered for Sarnoff Corporation, no. US6289309, 9/11/2001
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
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
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
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
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

STUDENT SUPERVISION

44. Xianbo Xu, *Context-Aware Preference Learning System using Dirichlet Process Gaussian Mixture Model*, MSc thesis, 7/2023
43. Yigit Erturk, *Gaussian Message Passing with NUV Priors*, MSc traineeship, 11/2022
42. Jim Beckers, *Training and Compression of Bayesian Neural Networks through Free Energy Minimization*, MSc thesis, 09/2022
41. Alp Sari, *Variational Bayes for Robust Radar Object Tracking*, MSc thesis, 07/2022
40. Jim Beckers, *Iterative Word Classification based on Boundary Selection using Bayesian Model Comparison*, MSc traineeship, 11/2021
39. Alp Sari, *Adaptive Optimizer Design for Constrained Variational Inference*, MSc traineeship, 11/2021

38. Thijn Hermsen, *Bayesian Inference for Financial Trading*, MSc traineeship, 10/2021
37. Wenjun Huang, *Collaborative Bayesian Optimization Framework with Pairwise Comparison*, MSc thesis, 9/2021
36. Hoang Nguyen, *Gaussian Process-based Amortization of Variational Message Passing Update Rules*, MSc thesis, 8/2021
35. Martin de Quincey, *Efficient Kalman Smoothing in Linear SSMs using Gaussian Message Passing*, MSc traineeship project, 6/2021
34. Thijn Hermsen, *Dynamic Modeling for Simulating a Football Player's Decision-Making Process*, MSc thesis, 6/2021
33. Mark Legters, *A Probabilistic Approach to Situated Acoustic Road Event Detection*, MSc thesis, 4/2021
32. Hoang Nguyen, *Differentiable Programming for Speech and Audio Processing*, MSc traineeship project, 11/2020
31. Bart van Erp, *Towards Situated Soundscaping in Hearing Aids*, MSc thesis, 9/2020
30. Burak Ergul, *A Real-World Implementation of Active Inference*, MSc thesis, 4/2020
29. Ismail Senoz, *Generative Probabilistic Models for Audio Textures*, MSc thesis, 10/2017
28. Jiyang Li, *Online Preference Learning*, MSc internship, 9/2017
27. Anouk van Diepen, *A Probabilistic Modeling Approach to In-situ Trainable Gesture Recognition*, MSc thesis, 5/2017
26. Wouter van Roosmalen, *In-situ Design of Noise Reduction Algorithms*, MSc thesis, 6/2016
25. Anouk van Diepen, *Derivation and Implementation of Gausssian Mixture Model in a Forney-style Factor Graph* MSc internship, 6/2016
24. Pradeep Kumar, *On Discrete-Valued Message Passing in Factor Graphs* MSc practical training project, 10/2015
23. Rene Duijkers, *A Factor Graph Approach to Hearing Loss Compensation* MSc thesis, 10/2014
22. Max Schoonderbeek, *A Factor Graph Approach to Gaussian Process Preference Learning* MSc thesis, 10/2014
21. Art Senders, *A Julia Toolbox for Forney-style Factor Graphs*, MSc practical training project, 6/2014
20. Robert Leenders, *Gaussian Process based Preference Learning as a Classification Problem* B.Sc. final project, 4/2014
19. Rene Duijkers, *Online Bayesian Spectral Tracking*, MSc practical training project, 1/2014
18. Brian Hutama Susilo, *Automated Tuning Algorithm for Low-latency PC-based Audio Processing* MSc practical training project, 12/2013
17. Zijian Xu, *Fast Design of Audio Processing Algorithms by Interactive Parameter Exploration*, MSc thesis, 8/2013
16. Timur Bagautdinov, *A Machine Learning Framework for Bayesian Signal Processing*, MSc thesis, 8/2013

15. Marno van der Maas, *Browser-based Remote Control of Hearing Aids*, B.Sc. research project, 6/2013
14. Timur Bagautdinov, *A MATLAB/C++ toolbox for Factor Graph Modeling*, MSc traineeship project, 12/2012
13. Maarten Thomassen, *Spectral Audio Monitoring*, MSc practical training project, 6/2012
12. Joris Kraak, *Computer-Aided Algorithm Design for Audio Processing*, MSc-thesis, 4/2012
11. Joris Kraak, *Optimization of a Spectral Noise Tracking Algorithm*, MSc practical training project, 10/2010
10. Jianfeng Li, *Acoustic scene-adaptive speech enhancement*, MSc-thesis, 8/2010
9. Jianfeng Li, *Spatial defect clustering on semiconductor wafers using image processing techniques*, MSc thesis, 8/2009
8. Xueru Zhang, *Bayesian periodogram smoothing for speech enhancement*, PD.Eng.-thesis, 9/2008
7. Rene Besseling, *Gaussian processes in Bekesy audiometry*, MSc project, 6/2008
6. Serkan Ozer, *Bayesian linear regression for user-adaptive hearing aids*, MSc thesis, 8/2007
5. Ronnie van Loon, *a Probabilistic Approach to Sound Classification* MScthesis, 6/2007
4. Anton Vakrushev, *Interactive machine learning for Personalization of hearing aid algorithms*, PD.Eng. thesis, 9/2006
3. Jorik Caljouw, *PDA-based Interfacing to a real-time audio platform*, MSc practical training, 10/2005
2. Paul Aelen, *Determination of the Intra-Uterine Pressure with electrodes on the abdomen*, MSc thesis, 10/2005
1. Job Geurts, *A PC-based real-time simulation platform for evaluating hearing aid algorithms*, MSc practical training, 6/2005

SUPERVISOR PhD COMMITTEE

4. Semih Akbayrak, PhD, *Towards Universal Probabilistic Programming with Message Passing on Factor Graphs*, TU Eindhoven, 1/2023
3. Albert Podusenko, PhD, *Message Passing-based Inference in Hierarchical Autoregressive Models*, TU Eindhoven, 12/2022
2. Ismail Senoz, PhD, *Message Passing Algorithms for Hierarchical Dynamical Models*, TU Eindhoven, 6/2022
1. Thijs van de Laar, PhD, *Automated Design of Bayesian Signal Processing Algorithms*, TU Eindhoven, 6/2019

MEMBER PhD COMMITTEE

16. Alvaro Correia, PhD, *Insights on Learning Tractable Probabilistic Graphical Models*, TU Eindhoven, 6/2023
15. Bojian Yin, PhD, *Efficient and Accurate Spiking Neural Networks*, TU Eindhoven, 12/2022
14. Shengling Shi, PhD, *Topological Aspects of Linear Dynamic Networks: Identifiability and Identification*, TU Eindhoven, 9/2021
13. Oleg Solopchuk, PhD, *Information-theoretic Approach to Decision Making in Continuous Domains*, Université Catholique de Louvain, 02/2021

12. Bahram Yoosefizonooz, PhD, *Computational and Learning Mechanisms in the Human Auditory System*, Radboud Universiteit Nijmegen, 09/2020
11. Negar Ahmadi, PhD, *EEG Microstate and Functional Brain Network Features for Classification of Epilepsy and PNES*, TU Eindhoven, 11/2019
10. Chara Papatsimpa, PhD, *Performance of Intelligent Lighting Sensor Networks: Analysis, Modelling and Distributed Architectures*, TU Eindhoven, 5/2019
9. Andreas Koutrouvelis, PhD, *Multi-microphone Noise reduction for Hearing Assistive Devices*, Delft University of Technology, 12/2018
8. Juan Sebastian Olier, PhD, *Dynamic Representations: Building knowledge through an active representational process based on deep generative models*, Eindhoven University of Technology, 10/2018
7. Henk Kortier, PhD, *Assessment of Hand Kinematics and Interactions with the Environment*, University of Twente, 02/2018
6. Math Verstraelen, PhD, *The WaveCore - A Scalable Architecture for Real-time Audio Procesing* University of Twente, 01/2017
5. Amir Jalalirad, PhD, *Supervised Learning through Feature-based Models*, TU Eindhoven, 12/2016
4. Yuan Zeng, PhD, *Distributed Speech Enhancement in Wireless Acoustic Sensor Networks*, Delft University of Technology, 6/2015
3. Ingeborg Brons, PhD, *Perceptual evaluation of noise reduction in hearing aids*, University of Amsterdam, 12/2013
2. Jelte Vink, PhD, *Machine Learning for Efficient Object Recognition*, TU Eindhoven, 9/2013
1. Adriana Birlutiu, PhD, *Machine Learning for Pairwise Data*, University of Nijmegen, 10/2011

JOURNAL ARTICLES

See also my google scholar page.

25. J Beckers, B van Erp, Z Zhao, K Kondrashov, B de Vries, Principled Pruning of Bayesian Neural Networks through Variational Free Energy Minimization, arXiv:2210.09134 preprint
24. Thijs van de Laar, Magnus Koudahl, Bart van Erp and Bert de Vries, Active Inference and Epistemic Value in Graphical Models, Frontiers in Robotics and AI, Jan 2022
23. Albert Podusenko, Bart van Erp, Magnus Koudahl and Bert de Vries, AIDA: An Active Inference-based Design Agent for Audio Processing Algorithms, Frontiers in Signal Processing, Jan 2022
22. Magnus Koudahl, Wouter Kouw and Bert de Vries, On Epistemics in Expected Free Energy for Linear Gaussian State Space Models, Entropy, 23(12), 2021
21. Bart van Erp, Albert Podusenko, Tanya Ignatenko and Bert de Vries, A Bayesian Modeling Approach to Situated Design of Personalized Soundscaping Algorithms, Applied Sciences, 11(20), 10/2021
20. Marco Cox and Bert de Vries, Bayesian Pure-Tone Audiometry Through Active Learning Under Informed Priors, Front. Digit. Health, August 2021
19. Semih Akbayrak, Ivan Bocharov and Bert de Vries, Extended Variational Message Passing for Automated Approximate Bayesian Inference, *Entropy* 23(7), 815, June 2021

18. Ismail Senoz, Thijs van de Laar, Dmitry Bagaev and Bert de Vries, Variational Message Passing and Local Constraint Manipulation in Factor Graphs, *Entropy*, 23(7), 807, June 2021
17. Albert Podusenko, Wouter Kouw and Bert de Vries, Message Passing-Based Inference for Time-Varying Autoregressive Models, *Entropy*, 23(6), 683, May 2021
16. Thijs van de Laar and Bert de Vries, Simulating Active Inference Processes by Message Passing, *Frontiers in Robotics and AI*, March 2019
15. Marco Cox, Thijs van de Laar and Bert de Vries, A Factor Graph Approach to Automated Design of Bayesian Signal Processing Algorithms, *International Journal of Approximate Reasoning*, Nov. 2018
14. Bert de Vries and Karl J. Friston, A Factor Graph Description of Deep Temporal Active Inference, *Frontiers in Computational Neuroscience*, Oct. 2017
13. Karl J. Friston, Thomas Parr and Bert de Vries, The graphical brain: belief propagation and active inference, *Network Neuroscience*, the MIT Press, vol.1, no.1, pp.1-78, 2017
12. Thijs van de Laar and Bert de Vries, A Probabilistic Modeling Approach to Hearing Loss Compensation, *IEEE Tr. on Audio, Speech and Language Processing*, Nov. 2016
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, October 2007
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
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
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
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 **[240]**
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
3. Bert de Vries, Temporal processing with neural networks-the development of the Gamma model, *PhD dissertation*, University of Florida, 1991
2. Joachim Gravenstein et al., Sampling intervals for clinical monitoring of variables during anesthesia, *Journal of clinical monitoring* vol 5(1), 1989
1. Jan J. van der Aa, Bert de Vries and Joachim Gravenstein, Toward more sophisticated monitoring alarms, *Journal of clinical monitoring* 4 (2), 1986

CONFERENCE CONTRIBUTIONS

91. Mykola Lukashchuk et al., Efficient Bayesian inference by conjugate-computation variational message passing, *Machine Learning in Signal Processing (MLSP) conference*, Rome, Italy, 09/2023
90. Hoang Nguyen et al., Gaussian process amplitude demodulation by message-passing, *Machine Learning in Signal Processing (MLSP) conference*, Rome, Italy, 09/2023
89. Bert de Vries, Toward Design of Synthetic Active Inference Agents by Mere Mortals, 4th International Workshop on Active Inference (IWAI), Ghent, Belgium, Sep 2023
88. Albert Podusenko et al., Message Passing-Based Inference in the Gamma Mixture Model, *Machine Learning in Signal Processing (MLSP) conference*, online presentation, 10/2021
87. Ismail Senoz, Semih Akbayrak, Albert Podusenko, Chris Mathys and Bert de Vries, The Switching Hierarchical Gaussian Filter, *Symposium on Information Theory, ISIT-2021*, online presentation, July 2021
86. Dmitry Bagaev and Bert de Vries, ReactiveMP.jl: Reactive Message Passing-based Bayesian Inference, *JuliaCon conference*, online presentation, July 2021
85. Bart van Erp, Ismail Senoz and Bert de Vries, Variational Log-Power Spectral Tracking for Acoustic Signals, *IEEE Statistical Signal Processing Workshop (SSP)*, online presentation, July 2021
84. Burak Ergul et al., Learning Where to Park, *1st. Int'l workshop on Active Inference (IWAI-2020)*, Ghent, Belgium, Sep. 2020
83. Magnus Koudahl and Bert de Vries, A Worked Example of Fokker-Planck-based Active Inference, *1st. Int'l workshop on Active Inference (IWAI-2020)*, Ghent, Belgium, Sep. 2020
82. Dmitry Bagaev, Thijs van de Laar and Bert de Vries, Rocket.jl:A Julia package for reactive programming, *JuliaCon* conference, online presentation, July 2020
81. Martin Roa Villescas et al., Real-time Audio Processing for Hearing Aids using a Model-Based Bayesian Inference Framework, *SCOPES '20: Proceedings of the 23th International Workshop on Software and Compilers for Embedded Systems*, May 2020
80. Albert Podusenko, Wouter Kouw and Bert de Vries, Online Variational Message Passing in Hierarchical Autoregressive Models, *IEEE International Symposium on Information Theory*, Los Angeles, CA, June 2020
79. Ismail Senoz and Bert de Vries, Online Message Passing-based Inference in the Hierarchical Gaussian Filter, *IEEE International Symposium on Information Theory*, Los Angeles, CA, June 2020
78. Ismail Senoz et al. , Bayesian joint state and parameter tracking in autoregressive models, *Learning for Dynamics and Control (L4DC)*, Berkeley, CA, June 2020
77. Patrick W.A. Wijnings, Sander Stuijk, Bert de Vries, Henk Corporaal, Approximate Inference by Kullback-Leibler Tensor Belief Propagation, *ICASSP-2020*, Barcelona, May 2020
76. Magnus T. Koudahl, Bert de Vries, BATMAN: Bayesian Target Modelling for Active Inference, *ICASSP-2020*, Barcelona, May 2020
75. Bert de Vries, Natural Artificial Intelligence, *AI in Engineering Symposium*, Eindhoven, Oct 2019

74. Semih Akbayrak and Bert de Vries, Reparameterization Gradient Message Passing, *EUSIPCO*-2019, Barcelona, Sep 2019

73. Albert Podusenko, Wouter Kouw and Bert de Vries, Online Variational Message Passing in Autoregressive Models, *Symposium on Information Theory in the Benelux*, Ghent (Belgium), May 2019

72. Magnus Koudahl, Wouter Kouw and Bert de Vries, Agent Alignment by Active Inference, *Symposium on Information Theory in the Benelux*, Ghent (Belgium), May 2019

71. Patrick Wijnings, Sander Stuijk, Bert de Vries and Henk Corporaal, Robust Bayesian Beamforming for Sources at Different Distances with Applications in Urban Monitoring, *Int'l Conference on Audio, Speech and Signal Processing (ICASSP)*, Brighton (UK), May 2019

70. Marco Cox, Thijs van de Laar, Bert de Vries, ForneyLab.jl: Fast and flexible automated inference through message passing in Julia, *First Int'l conf. on Probabilistic Programming*, Boston (MA), October 2018

69. Thijs van de Laar et al., ForneyLab: A Toolbox for Biologically Plausible Free Energy Minimization in Dynamic Neural Models, *Conference on Complex Systems*, Thessaloniki, Greece, September 2018

68. Ismail Senoz and Bert De Vries, Online Variational Message Passing In The Hierarchical Gaussian Filter, (*Best student paper award*), *Machine Learning for Signal Processing conference (MLSP)*, Aalborg, Denmark, September 2018

67. Ivan Bocharov et al., Acoustic Scene Classification from Few Examples, *EUSIPCO*, Rome, Italy, September, 2018

66. Marco Cox and Bert de Vries, Robust Expectation Propagation in Factor Graphs Involving Both Continuous and Binary Variables, *EUropean SIgnal Processing COnference (EUSIPCO-2018)*, Rome, Italy 2018

65. Thijs van de Laar, Marco Cox, Bert de Vries , ForneyLab.jl: a Julia Toolbox for Factor Graph-based Probabilistic Programming, *JuliaCon 2018*, youtube, London (UK), August 2018

64. Ivan Bocharov, Bert de Vries and Tjalling Tjalkens, K-shot Learning of Acoustic Context, NIPS-2017 workshop on machine learning for audio signal processing, Long Beach (CA), Dec 2017

63. Marco Cox and Bert de Vries, A parametric approach to Bayesian optimization with pairwise comparisons. NIPS-2017 workshop on Bayesian Optimization, Long Beach (CA), Dec 2017

62. Thijs van de Laar, Marco Cox, Anouk van Diepen and Bert de Vries, Variational Stabilized Linear Forgetting in State-Space Models, *EUSIPCO-2017*, KOS Island (Greece), Aug.2017

61. Marco Cox and Bert de Vries, A Gaussian Process Mixture Prior for Hearing Loss Modeling, *Machine Learning Conference of the Benelux* (Benelearn), Eindhoven, 2017

60. Anouk van Diepen et al., An In-situ Trainable Gesture Classifier, *Machine Learning Conference of the Benelux* (Benelearn), Eindhoven, 2017

59. Quan (Eric) Nguyen et al., Probabilistic Inference-based Reinforcement Learning, *Machine Learning Conference of the Benelux* (Benelearn), Eindhoven, 2017

58. Thijs van de Laar and Bert de Vries, A Probabilistic Modeling Approach to Hearing Loss Compensation, *Machine Learning Conference of the Benelux* (Benelearn), Eindhoven, 2017

57. Mojtaba Farmani and Bert de Vries, A Probabilistic Approach To Hearing Loss Compensation, *IEEE Machine Learning for Signal Processing workshop* (MLSP), Reims, FR, Sep 2014

56. Bert de Vries et al., Efficient Hearing Aid Spectral Signal Processing with an Asynchronous Warped Filterbank, *Int'l Hearing Aid Research Conference* (IHCON), Lake Tahoe, CA, August 2014

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

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

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

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 Audibilit y, Intelligibility and Comfort, *IEEE Benelux Signal Processing Symposium*, Hilvarenbeek, Netherlands, April 2004

30. Rob de Vries and Bert de Vries, Toward SNR-Loss Restoration in Digital Hearing Aids, *ICASSP 2002*, Orlando, FL, May 2002

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, Convolutive Blind Source Separation based on Multiple Decorrelation, *IEEE workshop on Neural Networks for Signal Processing VIII*, pp.23-32, Cambridge, UK, 1998 **[93]**

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, Convolutive Source Separation and Signal Modeling with Maximum Likelihood, *International Symposium on Intelligent Systems* (ISIS'97), Regio Calabria, Italy, 1997

23. Q. Lin et al., Robust distant-talking speech recognition, *ICASSP-96*, Atlanta,GA, May 1996

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

21. Lin et al., Experiments on distant-talking speech recognition, *ARPA Workshop on Spoken Language Technology*, Austin, TX, January 1995

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

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

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

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

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

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

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

7. Principe et al., Modeling applications with the focused gamma net, *NIPS-4 proceedings*, Denver, CO, 1992

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 [**63**]

4. Bert de Vries et al., Neural net models for temporal processing, *Proceedings nineth 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