

List of publications

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The titles of ten most important publications are shown as **bold** with an asterisk.

1 Refereed Scientific Journal Articles and Book Chapters

- [1] Santala O and Pulkki V. “* **Directional perception of distributed sound sources.**” *J. Acoust. Soc. Am.*, 2011. Accepted for publication.
- [2] Laitinen MV, Kuech F, Disch S, and Pulkki V. “* **Reproducing Applause-Type Signals with Directional Audio Coding.**” *J. Audio Eng. Soc.*, 2011. Accepted for publication.
- [3] Pulkki V, Lokki T, and Rocchesso D. “Spatial effects.” In Zoelzer U, editor, “DAFX – Digital Audio Effects 2nd edition,” Wiley, 2011. In press.
- [4] Pulkki V, Laitinen MV, Vilkamo J, Ahonen J, Lokki T, and Pihlajamäki T. “Perception-based reproduction of spatial sound with directional audio coding.” In Suzuki, Brungart, Iida, Cabrera, Iwaya, and Kato, editors, “Int. Workshop on Applications of Spatial Hearing,” World scientific, 2011. In press.
- [5] Pulkki V. “Multi-channel sound reproduction.” In D Havelock SK and Vorländer M, editors, “Handbook of Signal Processing in Acoustics,” Springer, 2009.
- [6] Vilkamo J, Lokki T, and Pulkki V. “Directional audio coding: Virtual microphone-based synthesis and subjective evaluation.” *J. Audio Eng. Soc.*, 57(9):709–724, September 2009.
- [7] Pulkki V and Hirvonen T. “* **Functional count-comparison model for binaural decoding.**” *Acta Acustica united with Acustica*, 95(5):883–900, Sep/Oct 2009.
- [8] Pätynen J, Pulkki V, and Lokki T. “Anechoic Recording System for Symphony Orchestra.” *Acta Acustica united with Acustica*, 94(6):856–865, 2008.
- [9] Pulkki V and Karjalainen M. “* **Multichannel audio rendering using amplitude panning.**” *IEEE Signal Proc. Mag.*, 25(3):118–122, 2008.
- [10] Lokki T, Pulkki V, and Calamia P. “Measurement and modeling of diffraction from an edge of a thin panel.” *Applied Acoust.*, 69(9):824–832, 2008.
- [11] Pulkki V. “* **Spatial Sound Reproduction with Directional Audio Coding.**” *J. Audio Eng. Soc.*, 55(6):503–516, 2007.
- [12] Hirvonen T and Pulkki V. “Perception and analysis of selected auditory events with frequency-dependent direction.” *J. Audio Eng. Soc.*, 54(9):803–814, 2006.
- [13] Hirvonen T and Pulkki V. “Center and spatial extent of auditory events as caused by multiple sound sources in frequency-dependent directions.” *Acta Acustica united with Acustica*, 92(11):320–330, 2006.
- [14] Pulkki V and Merimaa J. “Spatial impulse response rendering II: Reproduction of diffuse sound and listening tests.” *J. Audio Eng. Soc.*, 54(1):3–20, Jan./Feb. 2006.

- [15] Merimaa J and Pulkki V. “* **Spatial Impulse Response Rendering I: Analysis and Synthesis.**” *J. Audio Eng. Soc.*, 53(12):1115–1127, Dec. 2005.
- [16] Pulkki V and Hirvonen T. “* **Localization of Virtual Sources in Multichannel Audio Reproduction.**” *IEEE Trans. on Speech and Audio Signal Proc.*, 13(1):105–119, Jan. 2005.
- [17] Pulkki V. “Spatialization with multiple loudspeakers.” In “Audio Anecdotes vol II,” AK Peters, 2004.
- [18] Pulkki V and Lokki T. “Visualization of Edge Diffraction.” *Acoustic Research Letters Online*, 4(4):118–123, Oct. 2003.
- [19] Pulkki V and Karjalainen M. “Localization of amplitude-panned virtual sources I: Stereophonic panning.” *J. Audio Eng. Soc.*, 49(9):739–752, Sept. 2001.
- [20] Pulkki V. “* **Localization of Amplitude-Panned Virtual Sources II: three-dimensional panning.**” *J. Audio Eng. Soc.*, 49(9):753–767, Sept. 2001.
- [21] Pulkki V, Karjalainen M, and Huopaniemi J. “Analyzing virtual sound source attributes using a binaural auditory model.” *J. Audio Eng. Soc.*, 47(4):203–217, Apr. 1999.
- [22] Pulkki V. “Creating generic soundscapes in multichannel loudspeaker systems using vector base amplitude panning in csound synthesis software.” *Organised Sound*, 3(2):129–134, 1998.
- [23] Pulkki V. “* **Virtual Source Positioning Using Vector Base Amplitude Panning.**” *J. Audio Eng. Soc.*, 45(6):456–466, Jun. 1997.

2 Refereed Conference Proceeding Articles

- [1] Ahonen J and Pulkki V. “Broadband Direction Estimation Method Utilizing Combined Pressure and Energy Gradients from Optimized Microphone Array.” In “IEEE Int. Conf. Acoustics, Speech and Signal Proc. ICASSP,” IEEE, 2011. Accepted.
- [2] Laitinen MV and Pulkki V. “Converting 5.1 Audio Recordings to B-format for Directional Audio Coding Reproduction.” In “IEEE Int. Conf. Acoustics, Speech and Signal Proc. ICASSP,” IEEE, 2011. Accepted.
- [3] Ahonen J and Pulkki V. “Speech Intelligibility in Teleconference Application of Directional Audio Coding.” In “Proc AES 40th Int Conf,” Tokyo, Japan, Oct 2010.
- [4] Bossuyt S, Soynila E, Penttinen H, Pulkki V, and Hänninen H. “Thermoplastic wire drawing from bulk metallic glass.” In “MRS Fall Meeting,” Boston, US, Nov 29- Dec 3 2010.
- [5] Ahonen J and Pulkki V. “Diffuseness estimation using temporal variation of intensity vectors.” In “IEEE Workshop on Applications of Signal Processing to Audio and Acoustics,” pages 337–340. New Paltz, NY, USA, October 18-21 2009.
- [6] Laitinen MV and Pulkki V. “Binaural reproduction for directional audio coding.” In “IEEE Workshop on Applications of Signal Processing to Audio and Acoustics,” pages 337–340. New Paltz, NY, USA, October 18-21 2009.
- [7] Hiipakka M, Karjalainen M, and Pulkki V. “* **Estimating pressure at eardrum with pressure-velocity measurement from ear canal entrance.**” In “IEEE Workshop on Applications of Signal Processing to Audio and Acoustics,” New Paltz, NY, USA, October 18-21 2009.
- [8] Ahonen J, Pulkki V, and Lokki T. “Teleconference Application and B-format Microphone Array for Directional Audio Coding.” In “the AES 30th International Conference on Intelligent Audio Environments,” Saariselkä, Finland, March 15-17 2007.

- [9] Hirvonen T and Pulkki V. “Predicting Binaural Masking Level Difference and Dichotic Pitch Using Instantaneous ILD Model.” In “the AES 30th International Conference on Intelligent Audio Environments,” Saariselkä, Finland, March 15-17 2007.
- [10] Hirvonen T. “Interaural coherence estimation with instantaneous ild.” In “7th Nordic Signal Processing Symposium,” IEEE, Reykjavik, Iceland, Jun. 2006.
- [11] Merimaa J and Pulkki V. “Spatial impulse response rendering.” In “The 7th International Conference on Digital Audio Effects,” pages 139–144. Naples, Italy, Oct. 2004. Invited paper.
- [12] Hämäläinen P, Mäki-Patola T, Pulkki V, and Airas M. “Musical computer games played by singing.” In “The 7th International Conference on Digital Audio Effects,” pages 367–371. Naples, Italy, Oct. 2004.
- [13] Childs E and Pulkki V. “Using multi-channel spatialization in sonification: a case study with meteorological data.” In “the 9th International Conference on Auditory Display,” pages 233–242. Boston, USA, Jul. 2003.
- [14] Merimaa J and Pulkki V. “Perceptually-based processing of directional room responses for multichannel loudspeaker reproduction.” In “IEEE Workshop on Applications of Signal Processing to Audio and Acoustics,” pages 51–54. New Paltz, New York, USA, Oct. 2003.
- [15] Pulkki V. “Compensating displacement of amplitude-panned virtual sources.” In “the AES 22nd International Conference on Virtual, Synthetic and Entertainment Audio,” pages 186–195. Espoo, Finland, Jun. 2002.
- [16] Lokki T and Pulkki V. “Evaluation of geometry-based parametric auralization.” In “the AES 22nd International Conference on Virtual, Synthetic and Entertainment Audio,” pages 367–376. Espoo, Finland, Jun. 2002.
- [17] Härmä A, Lokki T, and Pulkki V. “Drawing Quality Maps of the Sweet Spot and Its Surroundings in Multichannel Reproduction and Coding.” In “the AES 21st International Conference on Architectural Acoustics and Sound Reinforcement,” pages 317–325. St. Petersburg, Russia, Jun. 2002.
- [18] Lokki T and Pulkki V. “The Effect of Early Reflections on Perceived Timbre - Analyzed with and Auditory Model.” In “the 8th International Conference on Auditory Display,” pages 320–325. Kyoto, Japan, Jul. 2002.
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- [20] Pulkki V. “Evaluating Spatial Sound with Binaural Auditory Model.” In “the International Computer Music Conference,” pages 73–76. Havana, Cuba, Sep. 2001.
- [21] Väänänen R, Huopaniemi J, and Pulkki V. “Comparison of Sound Spatialization Techniques in MPEG-4 Description.” In “the International Computer Music Conference,” pages 288–291. Berlin, Germany, Aug. 2000.
- [22] Pulkki V. “Generic Panning Tools for MAX/MSP.” In “the International Computer Music Conference,” pages 304–307. Berlin, Germany, Aug. 2000.
- [23] Pulkki V. “Uniform spreading of amplitude panned virtual sources.” In “Proceedings of the 1999 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics,” pages 187–190. Mohonk Mountain House, New Paltz, 1999.
- [24] Pulkki V, Karjalainen M, and Välimäki V. “Localization, coloration and enhancement of amplitude panned virtual sources.” In “AES 16th International Conference on Spatial Sound Reproduction,” pages 257–278. Rovaniemi, Finland, Apr. 1999.

- [25] Palomäki K, Pulkki V, and Karjalainen M. “Neural network approach to analyze spatial sound.” In “AES 16th International Conference on Spatial Sound Reproduction,” pages 233–245. Rovaniemi, Finland, Apr. 1999.
- [26] Pulkki V and Lokki T. “Creating auditory displays to multiple loudspeakers using vmap: A case study with diva project.” In “International Conference on Auditory Display,” pages 43–46. ICAD, Glasgow, England, 1998.
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- [28] Pulkki V and Harju T. “An implementation of the self-organizing map on the cnaps neurocomputer.” In “Proc. ICNN’96 International Conference on Artificial Neural Networks,” IEEE, 1996.
- [29] Pulkki V, Huopaniemi J, and Huotilainen T. “Dsp tool for 8-channel audio mixing.” In “Proc. NAM’96 Nordic Acoustical Meeting,” pages 307–314. The Acoustical Society of Finland, 1996.
- [30] Honkela T, Pulkki V, and Kohonen T. “Contextual relations of words in grimm tales, analyzed by self-organizing map.” In Fogelman-Soulié F and Gallinari P, editors, “Proc. ICANN’95, Int. Conf. on Artificial Neural Networks,” volume II, pages 3–7. EC2, Nanterre, France, 1995.

3 Thesis

- [1] Pulkki V. *Spatial Sound Generation and Perception by Amplitude Panning Techniques*. Doctoral thesis, Helsinki University of Technology, Laboratory of Acoustics and Audio Signal Processing, Espoo, Finland, Aug. 2001. <http://www.hut.fi/Yksikot/Kirjasto/Diss/2001/isbn9512255324/>.
- [2] Pulkki V. *Eräitä itseorganisoivan kartan digitaalisia toteutuksia (Some digital implementations of the self-organizing map)*. Master’s thesis, Helsinki University of Technology, Espoo, Finland, 1994.

4 Patents and public patent applications

- [1] Küch F, Kallinger M, Schultz-Amling R, Ahonen J, and Pulkki V. “Signal Pickup With A Variable Directivity Characteristic.”, June 25 2009. WO Patent App. WO/2009/077,152.
- [2] Pulkki V. “Method And Apparatus For Enhancement Of Audio Reconstruction.”, February 1 2008. US Patent App. 12/532,401.
- [3] Del Galdo G, Kuech F, Kallinger M, Pulkki V, Laitinen M, and Schultz-Amling R. “An Apparatus For Determining A Converted Spatial Audio Signal.”, February 18 2010. WO Patent App. WO/2010/017,978.
- [4] Del Galdo G, Kuech F, Kallinger M, Pulkki V, Laitinen M, and Schultz-Amling R. “Apparatus For Merging Spatial Audio Streams.”, February 18 2010. WO Patent App. WO/2010/017,966.
- [5] Disch S, Pulkki V, Laitinen M, and Erkut C. “An Apparatus For Determining A Spatial Output Multi-Channel Audio Signal.”, February 18 2010. WO Patent App. WO/2010/017,967.
- [6] Herre J and Pulkki V. “Method and Apparatus for Conversion Between Multi-Channel Audio Formats.”, February 1 2008. US Patent App. 12/530,645.
- [7] Pulkki V. “Method and Apparatus for Enhancement of Audio Reconstruction.”, 2008. US Patent 532,401.
- [8] Pulkki V, Merimaa J, and Lokki T. “A method for reproducing natural or modified spatial impression in multichannel listening.” Finnish patent FI 20030294 and PCT/FI 2004/000093, 2006. Mutual agreement of contributions: Pulkki 59.5%, Merimaa 34 % and Lokki 6.5 %.
- [9] Tolonen T and Pulkki V. “Generation of a note-based code.” U.S. Patent 6,541,691, 2001.

5 Conference papers with abstract review

- [1] Kim S, Lee YW, and Pulkki V. “New 10.2-channel vertical surround system (10.2-vss); comparison study of perceived audio quality in various multichannel sound systems with height loudspeakers.” In “AES,” San Francisco, CA, Nov. 4-7 2010. Paper # 8296.
- [2] Pulkki V, Laitinen MV, Vilkkamo J, Ahonen J, Lokki T, and Pihlajamäki T. “Directional audio coding - perception-based reproduction of spatial sound.” In “International Workshop on the Principles and Applications of Spatial Hearing,” Zao, Japan, November 11-13 2009. Invited paper, electronic proceedings.
- [3] Pulkki V. “Cross-frequency integration in inputs of functional model of mso.” In “International Symposium on Auditory and Audiological Research,” Helsingør, Denmark, August 26-28 2009.
- [4] Santala O and Pulkki V. “Perception of spatial distribution of wide sound sources.” In “International Symposium on Auditory and Audiological Research,” Helsingør, Denmark, August 26-28 2009.
- [5] Pulkki V, Laitinen MV, and Erku C. “Efficient spatial sound synthesis for virtual worlds.” In “The AES 35th International Conference,” London, UK, February 11-13 2009.
- [6] Galdo GD, Pulkki V, Kuech F, Laitinen MV, Schuitlz-Amling R, and Kallinger M. “Efficient methods for high quality merging of spatial audio streams in directional audio coding.” In “The 126th AES Convention,” Munich, Germany, May 7-10 2009.
- [7] Hirvonen T, Ahonen J, and Pulkki V. “Perceptual compression methods for metadata in directional audio coding applied to audiovisual teleconference.” In “The 126th AES Convention,” pages 1–9. Munich, Germany, May 7-10 2009.
- [8] Ahonen J, Pulkki V, Kuech F, Galdo GD, Kallinger M, and Schuitlz-Amling R. “Directional audio coding with stereo microphone input.” In “The 126th AES Convention,” pages 1–9. Munich, Germany, May 7-10 2009.
- [9] Takanen M, Jylhä A, Pihlajamäki T, Holm J, Huhtakallio I, and Pulkki V. “Localization of consecutive sound events in reverberant environment.” In “The 126th AES Convention,” pages 1–9. Munich, Germany, May 7-10 2009.
- [10] Santala O, Vertanen H, Pekonen J, Oksanen J, and Pulkki V. “The effect of listening room on audio quality in ambisonics reproduction.” In “The 126th AES Convention,” pages 1–8. Munich, Germany, May 7-10 2009.
- [11] Santala O and Pulkki V. “Resolution of spatial distribution perception with distributed sound source in anechoic conditions.” In “The 126th AES Convention,” pages 1–9. Munich, Germany, May 7-10 2009.
- [12] Lokki T, Patynen J, and Pulkki V. “Recording of anechoic symphony music.” In “Acoustics’08,” Paris, France, June 29 - July 4 2008. Invited paper.
- [13] Pulkki V. “Normalization in count-comparison model of interaural time difference decoding (abstract).” In “Acoustics’08,” Paris, France, June 29 - July 4 2008.
- [14] Kallinger M, Kuech F, Schuitlz-Amling R, Ahonen J, and Pulkki V. “Analysis and adjustment of planar microphone arrays for application in Directional Audio Coding.” In “The 124th AES Convention,” Amsterdam, Netherlands, May 17-20 2008. Paper 7374.
- [15] Schuitlz-Amling R, Kuech F, Kallinger M, Ahonen J, and Pulkki V. “Planar Microphone Array Processing for the Analysis and Reproduction of Spatial Audio using Directional Audio Coding.” In “The 124th AES Convention,” Amsterdam, Netherlands, May 17-20 2008. Paper 7375.

- [16] Ahonen J, Pulkki V, Kuech F, Kallinger M, and Schultz-Amling R. "Directional analysis of sound field with linear microphone array and applications in sound reproduction." In "The 124th AES Convention," Amsterdam, Netherlands, May 17-20 2008. Paper 7329.
- [17] Hirvonen T and Pulkki V. "Perceived distribution of horizontal ensemble of independent noise signals as function of sample length." In "The 124th AES Convention," Amsterdam, Netherlands, May 17-20 2008. Paper 7408.
- [18] Hirvonen T and Pulkki V. "Effect of interaural differences on loudness of narrowband noise bursts." In "The 124th AES Convention," Amsterdam, Netherlands, May 17-20 2008. Paper 7444.
- [19] Pulkki V and Ahonen J. "Nonexistence of frontal signal unmasking from spatially wide masker." In "The 124th AES Convention," Amsterdam, Netherlands, May 17-20 2008. Paper.
- [20] Pulkki V and Hirvonen T. "Computational count-comparison models for ITD and ILD decoding." In "Int. Conf. Acoustics, Madrid, Spain," Madrid, Spain, September 2-7 2007. Invited paper.
- [21] Pulkki V. "Applications of directional audio coding in audio." In "Int. Conf. Acoustics, Madrid, Spain," Madrid, Spain, September 2-7 2007. Invited paper.
- [22] Pulkki V, Svensson P, and Paatero T. "Efficient representation of edge diffraction impulse responses." In "Int. Conf. Acoustics, Madrid, Spain," Madrid, Spain, September 2-7 2007. Invited paper.
- [23] Hiekkänen T, Lempiinen T, Mattila M, Veijanen V, and Pulkki V. "Reproduction of Virtual Reality with Multichannel Microphone Techniques." In "The 122nd AES Convention," Vienna, Austria, May 5-8 2007.
- [24] Raitio T, Lehtonen HM, Laine P, and Pulkki V. "Detection and Lateralization of Sinusoidal Signals in Presence of Dichotic Pink Noise." In "The 122nd AES Convention," Vienna, Austria, May 5-8 2007.
- [25] Pulkki V. "Directional audio coding in spatial sound reproduction and stereo upmixing." In "AES 28th Internat. Conf.," pages 251–258. Pitea, Sweden, Jun. 2006.
- [26] Pulkki V and Faller C. "Directional audio coding: Filterbank and STFT-based design." In "120th AES Convention," Audio Engineering Society, Paris, France, May 20-23, 2006. Paper # 6658.
- [27] Pulkki V. "Computational two-channel ITD model." In "120th AES Convention," Audio Engineering Society, Paris, France, May 20-23, 2006. Paper # 6826.
- [28] Pulkki V. "Spatial impulse response rendering: Listening tests and applications to continuous sound." In "Proc. AES 118th Convention, paper #6371," Audio Engineering Society, Barcelona, Spain, 2005.
- [29] A Kelloniemi OP J Ahonen and Pulkki V. "Detection of subwoofer depending on crossover frequency and spatial angle between subwoofer and main speaker." In "Proc. AES 118th Convention, paper #6431," Audio Engineering Society, Barcelona, Spain, 2005.
- [30] Pulkki V. "äänitiloja (sound spaces)." A interactive spatial sound reproduction demonstration in science center Heureka in Vantaa, Finland, 2005.
- [31] Hameed S and Pulkki V. "Modeling coloration of virtual sound sources in listening rooms." In "Baltic-Nordic Acoustics Meeting 2004," Mariehamn, Åland, Jun. 2004.
- [32] Hirvonen T, Tikander M, and Pulkki V. "Multichannel reproduction of low frequencies." In "Baltic-Nordic Acoustics Meeting 2004," Mariehamn, Åland, Jun. 2004.
- [33] Pulkki V, Merimaa J, and Lokki T. "Reproduction of reverberation with spatial impulse response rendering." In "Convention paper # 6057 presented at the 116th AES Convention," Audio Engineering Society, Berlin, Germany, May 8-11, 2004.

- [34] Hameed S, Pakarinen J, Valde K, and Pulkki V. “Psychoacoustic cues in room size perception.” In “Convention paper # 6084 presented at the 116th AES Convention,” Audio Engineering Society, Berlin, Germany, May 8-11, 2004.
- [35] Lokki T and Pulkki V. “Measurement and theoretical validation of diffraction from a single edge.” In “In Proceedings of the 18th Congress on Acoustics ICA 2004,” pages 929–933. Kyoto, Japan, April 4-9, 2004.
- [36] Pulkki V, Merimaa J, and Lokki T. “Multi-channel reproduction of measured room responses.” In “In Proceedings of the 18th Congress on Acoustics ICA 2004,” pages 1273–1277. Kyoto, Japan, April 4-9, 2004.
- [37] Pulkki V and Lokki T. “Visualizing diffraction for educational purposes.” In “In Proceedings of the 18th Congress on Acoustics ICA 2004,” pages 2313–2317. Kyoto, Japan, April 4-9, 2004. Invited demonstration.
- [38] Pulkki V and Faller C. “The directional effect of crosstalk in multi-channel sound reproduction.” In “In Proceedings of the 18th Congress on Acoustics ICA 2004,” pages 3167–3171. Kyoto, Japan, April 4-9, 2004.
- [39] Lokki T and Pulkki V. “Modeling diffraction from an edge between surfaces with different materials.” In “In proceedings of the International Symposium on Room Acoustics: Design and Science (RADS +2004),” Hyogo, Japan, April 11-13, 2004. Paper # 029.
- [40] Pulkki V and Lokki T. “Visualizing diffraction of a loudspeaker enclosure.” In “Third International Conference on Modelling and Experimental Measurements in Acoustics,” pages 233–242. Cadiz, Spain, Jun. 2003.
- [41] Pulkki V. “Microphone Techniques and Directional Quality of Sound Reproduction.” In “the 112th AES Convention,” Munich, Germany, May 2002.
- [42] Pulkki V, Lokki T, and Savioja L. “Implementation and Visualization of Edge Diffraction with Image-Source Method.” In “the 112th AES Convention,” Munich, Germany, May 2002.
- [43] Ono K, Pulkki V, and Karjalainen M. “Binaural Modeling of Multiple Sound Source Perception: Coloration of Wideband Sound.” In “the 112th AES Convention,” Munich, Germany, May 2002.
- [44] Pulkki V. “Coloration of Amplitude-panned Virtual Sources.” In “the 110th AES Convention,” Amsterdam, The Netherlands, May 2001.
- [45] Ono K, Pulkki V, and Karjalainen M. “Binaural Modeling of Multiple Sound Source Perception: Methodology and Coloration Experiments.” In “the 111th AES Convention,” New York, NY, USA, Nov. 2001.
- [46] Lokki T, Savioja L, Hiipakka J, Hanninen R, Pulkki V, Väänänen R, Huopaniemi J, Ilmonen T, and Takala T. “Virtual concerts in virtual spaces—In real time?” In “Joint ASA/EAA Meeting,” Berlin, Germany, Mar. 1999.
- [47] Takala T, Rousku E, Lokki T, Savioja L, Huopaniemi J, Väänänen R, Pulkki V, and Salminen P. “Marienkirche - a visual and aural demonstration film.” Shown in SIGGRAPH’98 Computer Animation Festival, 1998. Electronic Art and Animation Catalogue, 1998.
- [48] Pulkki V, Karjalainen M, and Huopaniemi J. “Analyzing virtual source attributes using a binaural auditory model.” In “Preprint 4697, 104th Audio Engineering Society Convention,” AES, Amsterdam, The Netherlands, 1998.

6 Other Publications, Public talks

- [1] Pulkki V. “Time-frequency processing of spatial audio.” Arranged a repeated workshop, and gave a talk in them. AES 128th Conv., London, England; AES 40th Int. Conf. on Spatial Audio, and AES 129th Conv. SF, US, 2010.
- [2] Pulkki V. “Technology and psychophysics of spatial sound.” Talk in press conference of the Academy of Finland about ERC starting researcher grants, Dec. 3 2009.
- [3] Pulkki V. “Interviews of the research in Radio, TV and Press after the press conference Dec 2008 at the Academy of Finland.” Finnish Broadcasting Company (YLE), radio news Dec 17 2008; YLE TV science program ‘Prisma’ March 2009, Finnish-Swedish TV science program ‘Krökta rummet’ May 2009, more than 10 Finnish newspapers Dec 2008.
- [4] Pulkki V. “Tilääänen tutkimusta TKK:lla – kohti yleistä ääniteformaattia (spatial sound research at TKK – towards generic audio format).” Talk in press conference of the Academy of Finland, Dec. 17 2008.
- [5] Pulkki V. “Spatial sound — technologies and psychoacoustics.” Tutorial talk at Digital Audio Effects-08 conference 1-4.Sept. 2008, TKK, Espoo, Finland.
- [6] Pulkki V. “Frequency band processing in spatial sound reproduction: what do we need to reproduce?” Invited talk at 3D audio workshop 4-5 June 2007, NTNU, Trondheim, Norway.
- [7] Pulkki V, Faller C, Harma A, Lokki T, and de Bruijn W. “Spatial sound and virtual acoustics.” *EURASIP J. on Advances in Signal Processing*, pages Article ID 72647, 3 pages, 2007. Editorial, Special Issue on Spatial Sound and Virtual Acoustics.
- [8] Pulkki V. “Spatial sound reproduction using directional audio coding.” Keynote talk at First SpACE-Net Event, 18. Jan 2007, University of York, UK.
- [9] Pulkki V. “Advanced techniques for building interactive environments.” Workshop talk at AES 122th Conv., Vienna, Austria, 2007.
- [10] Pulkki V. “Surround recording and reproduction with height.” Workshop talk at AES 122th Conv., Vienna, Austria, 2007.
- [11] Rantanen K. “Tilääni tekee olon turvalliseksi (soothing spatial sound).” Haastattelu Tiede-lehteen 9/2007, Interview to a Finnish science magazine ‘Tiede’ 9/2007.
- [12] Sauvala M. “Tieteen toivot: Äänimiehen tehtävä (promising scientists: The task for audio engineer).” Haastattelu Ylioppilaslehteen 5/2007, Interview to a university student magazine ‘Ylioppilaslehti’ 5/2007.
- [13] Pulkki V. “Tilääänen teknologia ja psykoakustiikka. (spatial sound technology and psychoacoustics).” Talk at Fysiikan yö (Night of Physics) at Heureka Finnish Science center, Dec. 2005.
- [14] Pulkki V. “Radiaattori: Tilääni (radiator: Spatial sound).” Interview by Sisko Loikkanen in national radio channel Radio YLEn Ykkönen, Apr. 2002.
- [15] Pulkki V. “Radiaattori: Ihmisen suuntakuulo (radiator: Human directional hearing).” Interview by Sisko Loikkanen in national radio channel Radio YLEn Ykkönen, Apr. 2002.
- [16] Wessel D and Pulkki V. “Generic 3-d panning tool for the MAX/Msp computer music programming environment.”
- [17] Huopaniemi J, Pulkki V, and Lokki T. “Psychophysics and technology of virtual acoustic display.” Tutorial talk at Int. Conf. on Auditory Display, Glasgow, Scotland, 1998.
- [18] Pulkki V. “Vielä kolme.” Composition for male choir, PKY-108, Polytech Choirs patrons’ association, Espoo, Finland, 1994.

7 Technical Reports

- [1] V. Pulkki. Data averaging inside categories with the self-organizing map. Report A27, Helsinki Univ. of Technology, Laboratory of Computer and Information Science, Espoo, Finland, 1995.
- [2] V. Pulkki. A fast implementation of the maximum-search function in adaptive solutions' cnaps neurocomputer. Report A20, Helsinki Univ. of Technology, Laboratory of Computer and Information Science, Espoo, Finland, 1993.