

Klaus Arthur Josef Riederer — RESEARCH CV

Personal data

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karaudio@kar.fi
<http://www.kar.fi/KARAudio>

Time and place of birth

29.11.1971, Helsinki (municipal)

Marital status

Single

Citizenship

Finnish

Parents

Heli [& Leo] Riederer

Personal characteristics

A cheerful person, but persistent and thorough. Handy. Experimentalist. Eager to learn new issues, comprehends rapidly new thematic entities.

Education

Secondary school graduation

1990, Itäkeskus secondary school (language school).

Higher education

1990 – 1998 undergraduate studies, Helsinki University of Technology (HUT).

26.10.1998 Master of Science, Electrical Engineering. Major: Acoustics & Audio Signal Processing, minor: Applied Electronics.

1999 – 2005 postgraduate studies, Helsinki University of Technology (HUT).

19.12. 2005 Doctor of Science, Electrical and Communications Engineering. Major: Acoustics & Audio Signal Processing, minor I: Cognitive Technology, minor II: Interactive digital media.

Also widely multidisciplinary studies at HU and UAIH.

Work experience

K-Ohi Oy, Helsinki, Finland

12/1987, 06 – 08/1988

Computer assistant. Updated data systems.

Electronics assistant. Constructed prototypes, general office work.

Bergman Oy, Helsinki, Finland

06 – 07/1989

Construction worker. Different tasks concerning house building.

Telecom Finland Oy, Helsinki, Finland

06 – 08/1990, 06 – 08/1991

Electronics trainee. Developed test programs for integrated circuits. Repaired pulse code modulation equipment. Organized component stock.

Summer studies & house renovation

06 – 09/1993

Kone Instruments Oy, Espoo, Finland

06 – 09/1994

Research & Development / Electronics trainee. Extensive R&D work regarding embedded systems in clinical chemistry analyzers. Also developed a new archive system for component data.

Technical Research Center of Finland, Communities and Infrastructure

06 – 09/1995

Research assistant. Updating a simulation program of ground penetrating radar using FORTRAN77 in PC and UNIX -platforms; program development work.

Acoustical Society of Finland / NAM 96

01 – 06/1996

Nordic Acoustical Meeting 1996, conference secretary. E-mail correspondence, scheduling, paper acceptance, notification, calls for papers. Editor of proceedings (520 pages, all electronic format) together with Dr. Tapio Lahti.

HUT / Laboratory of Acoustics and Audio Signal Processing

06/1996 – 06/1998

Research assistant / Researcher. Master's Thesis on "Head-related transfer function measurements". Research on human spatial hearing and 3-D audio.

**Helsinki University of Arts and Design /
Multimedia laboratory**

09/1998 – 01/1999

Research and artistic work on visual communications: "Investigation of cultural differences between the United States and numerous South American countries through visual communication".
Photography on demanding field conditions, digital image processing, art and mediawork etc.

**HUT / Laboratory of Computational Engineering, 03/1999 – 12/2002
Cognitive Science and Technology group**

Research scientist. Three dimensional audio reproduction system development for audiovisual experiments. Acoustical and audio engineering consulting. Doctorate studies and research on human spatial hearing (in multimodal context).

**HUT / Laboratory of Acoustics
and Audio Signal Processing**

01/2003 – 12/2005

Research on human spatial hearing (in multimodal context). Master's Thesis on "Head-related transfer function measurements". Research on human spatial hearing and 3-D audio.

KAR

05/2002 – 11/2009

KAR Ltd

11/2009 –

Own company, customized services and products for various customers involving, e.g., the following. Acoustic, audio and IT consulting & scientific research. Custom electronics design & sales. Graphical design, pre-press work & calibration services. Fine art photography, hand-made large format print making. High quality scanning, digital image manipulation, tape art. Everything within all legal bounds.

P u b l i c a t i o n s , i n t e r n a t i o n a l r e f e r e e d j o u r n a l s

Human cortical representation of virtual auditory space: Differences between sound azimuth and elevation (Nobuya Fujiki, Klaus A J Riederer, Veikko Jousmäki, Jyrki Mäkelä & Riitta Hari)

European Journal of Neuroscience. Vol. **16**, pp. 2207-2213, 2003.

Processing of sound location in human cortex (Jörg Lewald, Klaus A J Riederer, Tobias Lentz, Ingo G Meister)

European Journal of Neuroscience. Vol. **27**, pp. 1261-1270, 2008.

P u b l i c a t i o n s , b o o k s

Proceedings of Nordic Acoustical Meeting 1996 (NAM 96) (Eds. Klaus A J Riederer & Tapio Lahti)

Acoustical Society of Finland, TTK Monistamo, Espoo, Finland. ISBN 951-22-3134-4. 520 p.

Part I. Head-related transfer function measurements

Master's Thesis. Helsinki University of Technology, Laboratory of Acoustics and Audio Signal Processing, 3.1.1998, Espoo, Finland, 134 + 16 p.

Part II. HRTF Analysis: Objective and Subjective Evaluation of Measured Head-related transfer function measurements

PhD Thesis. Helsinki University of Technology, Laboratory of Acoustics and Audio Signal Processing, 9.12.2005, Espoo, Finland. ISBN 951-22-7978-9, 383 p.

P u b l i c a t i o n s , b o o k c h a p t e r s

Elollisen kemian mallintaminen elävillä ja liikkuvilla soluautomaateilla (Modeling living chemistry with living and movable cell automata)

In Hyvönen E. ja Seppänen J. (Eds.) *Keinoelämä — Artificial Life, tekniikkaa, luonnontiedettä, filosofiaa ja taidetta* (Artificial life, techniques, natural sciences, philosophy and arts), Symposium 12.5.1995, Säätytalo, Helsinki, Finland, Finnish Artificial Intelligence Society, pp. 117-124.

Repeatability analysis of HRTF measurements

Begault D.R., (Ed.). [*AES Anthology Spatial Sound Techniques. Part 1: Virtual and Binaural Audio Technologies*](#). New York, NY, USA, Audio Engineering Society, pp. 372-416.

P u b l i c a t i o n s , i n t e r n a t i o n a l c o n f e r e n c e p a p e r s

DSP aspects of head-related transfer function measurements (& Matti Karjalainen)

In *IEEE Nordic Signal Processing Symposium, NORSIG'98*, Vigsø Holiday Resort, Denmark, 8-11.6.1998.

Measuring and modeling the effect of source distance in head-related transfer functions (Jyri Huopaniemi & Klaus A J Riederer)

In *ICA/ASA '98 Conf.*, Seattle, USA, 20-26.6.1998.

Frequency responses of stethoscopes (& Juha Backman)

In *Nordic Acoustical Meeting 1998 (NAM98)*, Stockholm, Sweden, 6-9.9.1998.

Repeatability analysis of HRTF measurements

In *105th AES Conv.*, Moscone Convention Center, San Francisco, CA, USA, 26-29.9.1998, preprint number 4846. 62 p.

Computational Quality Assessment of HRTFs

In *European Signal Processing Conference EUSIPCO (X)*, 5-8.9.2000, Tampere, Finland.

Investigation of multisensory spatial hearing: from the sense of audition to multisensory interactions

In *ACM Siggraph and Eurographics. Campfire: Acoustic Rendering for Virtual Environments*. Snowbird, Utah, USA, 26-29.5.2001

Human cortical representation of 3-dimensional sounds: differences between azimuth and elevation (Nobuya Fujiki, Klaus A J Riederer, Veikko Jousmäki, Jyrki Mäkelä & Riitta Hari)

In *Society for Neuroscience 31st Annual Meeting*, San Diego, CA, USA, 10.-15.11.2001

Sophisticated tube headphones for spatial sound reproduction (& Risto Niska)

In *AES 21st International Conference on Architectural Acoustics & Sound Reinforcement*, June 1-3, 2002, St. Petersburg, Russia, pp. 268-276.

Binaural sound reproduction with the UD-ADU1 tube headphones [Sound demonstration] (& Risto Niska)

Sound demonstration at *AES 21st International Conference on Architectural Acoustics & Sound Reinforcement*, June 1-3, 2002, St. Petersburg, Russia.

Part Ia: Spatial separation on McGurk effect applying three-dimensional sounds

In *146th Meeting of the Acoustical Society of America*, Austin, TX, USA, Nov. 10-14, 2003. *J. Acoust. Soc. Am* 114 (Pt. 2), pp. 2336.

Part Ib: Effects of eye-glasses, hair, headgear and clothing on measured head-related transfer functions

In *146th Meeting of the Acoustical Society of America*, Austin, USA, Nov. 10-14, 2003. *J. Acoust. Soc. Am* 114 (Pt. 2), pp. 2338.

Part IIa: Effects of congruency on localization of audiovisual three-dimensional speech sounds

In *146th Meeting of the Acoustical Society of America*, Austin, USA, Nov. 10-14, 2003. *J. Acoust. Soc. Am* 114 (Pt. 2), pp. 2339.

Part IIb: Effects of hair, clothing and headgear on localization of three-dimensional sounds

In *146th Meeting of the Acoustical Society of America*, Austin, TX, USA, Nov. 10-14, 2003. *J. Acoust. Soc. Am* 114 (Pt. 2), pp. 2339.

Part IIIa: Effect of microphone position changes on blocked *cavum conchae* head-related transfer functions

In *Proceedings of 18th International Congress on Acoustics ICA 2004*, Kyoto, Japan, April 4-9, pp. I-787 - I-790.

Part IVa: Effect of *cavum conchae* blockage on human head-related transfer functions

In *Proceedings of 18th International Congress on Acoustics ICA 2004*, Kyoto, Japan, April 4-9, pp. I-791 - I-794.

Part Va: Effect of head movements on measured head-related transfer functions

In *Proceedings of 18th International Congress on Acoustics ICA 2004*, Kyoto, Japan, April 4-9, pp. I-795 - I-798.

Ten mortal sins in digitization outsourcing

In *Baltic Audiovisual Archival Council Annual Conference 2012*, "From digitization to access and research", Helsinki, Finland, October 3 - 5, 2012.

Seeing is believing: how to make OCR work in practice

In *Baltic Audiovisual Archival Council Annual Conference 2014*, "Safe and reusable: ideals versus real life", Riga, Latvia, September 17 - 19, 2014.

Publications, other scientific work

2-D FDTF maa- ja kalliotutkasimulaattori (& Juhani Korkealaakso) (2-D FDTD ground and rock penetrating radar simulator)

In Timo Tervo (Ed.) *Geofysiikan X Neuvottelupäivät 15.-16.11.1995 Laajat tiivistelmät – Extended abstracts*, Vuorimiesyhdistys – Bergmannaföreningen r.y., Sarja B, No 59, Espoo 1995, Finland. ISBN 952-9618-17-4, ISSN 0783-1331.

Fysikaalinen mallintaminen digitaalisilla aaltojohtoverkoilla (Physical modeling with digital wave guide networks)

In Karjalainen M. ja Välimäki V. (Eds.) *Äänenkäsittelyn seminaari 1995: Akustisten järjestelmien diskreettiaikaiset mallit ja soittimien mallipohjainen äänisynteesi* (Seminar on audio signal processing: "Discrete time models of acoustical systems and sound synthesis of physical models of musical instruments"), Helsinki University of Technology, Laboratory of Acoustics and Audio Signal Processing, Report 39, Espoo, Finland, pp. 49-70.

Äänikenttäsynteesi (Sound field synthesis)

In Karjalainen M. (Eds.) *Akustiikan seminaari 1996: Aktiivinen äänenhallinta* (Seminar on acoustics: "Active sound control"), Helsinki University of Technology, Laboratory of Acoustics and Audio Signal Processing, Report 40, Espoo, Finland, pp. 169-201.

Transfer-function measurements in audio

In Karjalainen M. (Eds.) *Äänenkäsittelyn seminaari 1996: Digitaalitaaliodin signaalinkäsittelymenetelmiä* (Seminar on audio signal processing: "Signal processing methods in digital audio"), Helsinki University of Technology, Laboratory of Acoustics and Audio Signal Processing, Report 41, Espoo, Finland, pp.181-204.

Ihmisen suuntakuulon tutkiminen (& Jyri Huopaniemi) (Investigation of human spatial hearing)

In Peltonen T., Lahti T. ja Karjalainen M. (Eds.) *Akustiikkapäivät 1997* (Acoustic days 1997), Acoustical Society of Finland, Espoo, Finland, pp. 25-30.

Virtual Laboratory — Audiovisual psychophysiological laboratory

In *Nordic Interactive Multimedia Research School2 (NIMRES2) Proc., "In Terms of Design"*, University of Art and Design, Helsinki, Finland, 28.-30.5.1999.

3-D sound for psychophysiological laboratory

In *Multimodality in Languages and Speech Systems (MiLaSS) Summer School Proc.*, Kungliga Tekniska Högskolan, Stockholm, Sweden 12.-23.7.1999.

Technical publications

Enemmän vääntöä pienemmässä koossa — CeBit98 (More power in smaller size — CeBit98)

In *Mikrobitti 5/98*, Helsinki Media Company Oy, Vantaa, Finland, pp. 28-30.

Upottava virtuaalisuus on todellisuutta — Digitaalisten prototyyppien tulevaisuus on koittanut (Immersive virtuality is reality — we are at the dawn of the future of the digital prototypes)

In *Tietokone 9/98*, Helsinki Media Company Oy, Vantaa, Finland.

Tiläänentoisto tekee tuloaan — AES:n 16. kansainvälinen konferenssi Rovaniemellä (Surround sound is coming — AES 16th international conference in Rovaniemi)

In *Hifi 6-7/1999*, Helsinki Media Company Oy, Vantaa, Finland, pp. 40-41. ISSN 0357-0738.

Sonyn koirarobotit ensi kertaa robojalkapallon MM-areenalla (Premiere of the Sony's dog robots on football's world championships)

In *T-lehti 4/1999*, T-media Oy, Sanoma Osakeyhtiö, Forssa, Finland, p. 9, ISSN 1455-1519.
<http://oldwww.t-lehti.fi/arkisto/9904/hitech/hitech.html#Sonyn>

CeBIT00 – tekniikan uusimmat tuulet (CeBIT00 – new trends in technology)

In *T-lehti 2/2000*, T-media Oy, Sanoma Osakeyhtiö, Forssa, Finland, p. , ISSN 1455-1519.
<http://oldwww.t-lehti.fi/arkisto/0002/hitech/hitech.html#Cebit>

CeBIT'01

In *Aktivist 6/2001*, Aktivist Network Oy, Sanoma Osakeyhtiö, Forssa, Finland, p. 40.

Laadukasta tiläänitutkimusta Suomessa (Sophisticated spatial audio research in Finland)

In *Hifi 1/2003*, Helsinki Media Company Oy, Vantaa, Finland. ISSN 0357-0738.

Tulevaisuuden ääniä (Audio for the future)

In *Hifi 6-7/2003*, Helsinki Media Company Oy, Vantaa, Finland. ISSN 0357-0738.

Mullistava MPEG-4 (revolutionizing MPEG-4)

In *Hifi* 1/2004, Helsinki Media Company Oy, Vantaa, Finland. ISSN 0357-0738.

Technical 'letters' - published measurements with written analysis thereof, excerpt

[Countless loudspeaker measurements]

In *Hifi* 1996 – , Sanoma Magazines Finland Oy, Vantaa, Finland.

[Several loudspeaker measurements]

In *Tekniikan Maailma* 2005 – , Yhtyneet Kuvalehdet Oy, Helsinki, Finland.

In Tekniikan Maailma 2005 – , Yhtyneet Kuvalehdet Oy, Helsinki, Finland

In *Hifi* 6-7/2005, Helsinki Media Company Oy, Vantaa, Finland. ISSN 0357-0738, pp. 28-33.

Kuulokkeet 150 – 200 euroa, Kuuntelunautintoa kohtuupanostuksella. (Eräpuu J., Niska R., Riederer K. A. J., Tuomela P. & Väänänen P.) (Headphones 150 – 200 euro: Listening pleasure with a fair investment)

In *Hifi* 5/2002, Sanoma Magazines Finland Oy, Vantaa, Finland. ISSN 0357-0738,

Kuulokkeet 100 – 130 euroa, Kirjava joukko. Eräpuu J., Riederer K. A. J., Väänänen P. & Niska R., 2003) (Headphones 100 – 130 euro: Mixed group) (

In *Hifi* 8/2003, Helsinki Media Company Oy, Vantaa, Finland. ISSN 0357-0738, pp. 28-33.

Paremmat kevytkuulokkeet (Järvikivi M. and Riederer K. A. J.) (Better light-weighted headphones)

In *Hifi* 6-7/2005, Helsinki Media Company Oy, Vantaa, Finland. ISSN 0357-0738, pp. 28-33.

Edulliset hifikuulokkeet (Slip H., Koivusalo M., Heinvoio T., Helminen K., Riederer K. A. J. and Häyhä H.) (Economical Hi-Fi headphones)

In *Tekniikan Maailma* 7/2005, Yhtyneet Kuvalehdet Oy, Helsinki, Finland, pp. 140-144.

Subwooferit 900 – 1300 euroa — Mittaustulosten arviointi (Subwoofers 900 - 1300 euro — Evaluation of measurement results)

In *Nettijatkot* 11/2007, WWW-media by MikroBitti, Sanoma Magazines Finland Oy, Vantaa, Finland.

<http://www.mbnet.fi/nettijatkot/2007/11/subbarit/mittaukset.aspx>

Subwooferit 950 – 1100 euroa - Subwoofermittaukset TKK:lla (Tuomela P., Riederer K. A. J. et al., 2007) (Subwoofers 950 - 1100 euro - Subwoofer measurements at TKK).

In *Hifimaailma* 6/2007, Performance Magazines Oy, Espoo, Finland.

Kuulokemittauksia Helmutilla (Headphone measurements with Helmut; with photos)

In *Labra.Nyt* 12/2007, WWW-media by MikroBitti, Sanoma Magazines Finland Oy, Vantaa, Finland.

<http://www.mbnet.fi/mblabra/blogit/labra.nyt/juttu.aspx?id=2485>

Kuulokemittaukset rumpukalvolla (Headphone measurements on ear drum; with photos)

In *Nettijatkot* 01/2008, WWW-media by MikroBitti, Sanoma Magazines Finland Oy, Vantaa, Finland.

<http://www.mbnet.fi/nettijatkot/2008/01/kuulokkeet/>

Kuulokkeiden mittaaminen keinopäällä (Niska R., Riederer K. A. J. et. al, 2008) (Headphone measurements using a dummy head; with photo)

In *Hifimaailma* 3/2008, Performance Magazines Oy, Espoo, Finland.

Other publications

Vedostaminen — digitaalisen (raaka)kuvatiedoston muokkaus eri käyttötarkoituksia varten (Print making — working with digital image files for various purposes)

In Digiwiki, digitoinnin ja pitkäaikaissäilyttämisen verkkopalvelu, 2009

http://www.digiwiki.fi/fi/index.php?title=Kuvien_digitointi#Vedostaminen_-_

[_digitaalisen_.28raaka.29kuvatiedoston_muokkaus_eri_k.C3.A4ytt.C3.B6tarkoituksia_varten](http://www.digiwiki.fi/fi/index.php?title=Digitaalisen_28raaka.29kuvatiedoston_muokkaus_eri_k.C3.A4ytt.C3.B6tarkoituksia_varten)

(Useita artikkeleita) KAR Oy (Multiple articles, KAR Ltd)

In Digiwiki, digitoinnin ja pitkäaikaissäilyttämisen verkkopalvelu, 2009

<http://www.digiwiki.fi>

Aconcagua — Läntisen pallonpuoliskon katolla (& Petja Partanen) (Aconcagua — on top of the western hemisphere)

In *T-lehti* 2/1999, T-media Oy, Forssa, Finland, pp. 24-26, ISSN 1455-1519.

<http://oldwww.t-lehti.fi/arkisto/9902/lowtech/lowtech.html#Aconcagua>

Neljä viikkoa laudalla (Four weeks on snowboard)

In *T-lehti* 3/2000, T-media Oy, Sanoma Osakeyhtiö, Forssa, Finland, p. 34-35. ISSN 1455-1519.

Military service

Helsinki Air Defense Regiment

10/1991 – 09/1992

Special vehicle chauffeur. Broad experience in driving, maintenance and repair from tractors to army trucks & several camps (holding drivers license to full sized trucks).

Language skills

Mother tongue Finnish. Excellent skills in English, German and Swedish. Reasonable skills in Spanish. (Moderate comprehension of Italian and French).

Media activity

Competitions

Helsingin Sanomat (largest newspaper in Finland, circulation on weekdays 454 833) "Think of a funny advertisement", April 1995 — placing in top eight & published answer (replies in total 10218).

Audio-visual & graphical design

Rintala CD-ROM, spring 1996 — manuscript, production planning, navigation design and video editing with other group members. Course work in HUT Vie-98.250 Multimedia course, work acted as base for continuance for other Vie-98.* multimedia courses and later a grant was given by the Promotion Center to Audiovisual Cultures in Finland for further project development.

Logo design for housing community's 40 year anniversary in August 1996.

Appearances

Role in HUT's promotional video 1996 for high school graduates— repairman of network cables.

Role in HUT CD-ROM 1997 for high school graduates — test subject in head-related transfer function measurements.

Role in HUT's promotional video 1997 — researcher making head-related transfer function measurements.

Confidence work

Acoustics and audio engineering

Audio Engineering Society (AES) — 1995 – 2011 member.

Acoustical society of Finland. — 1995 – 2011 member, 1996 conference secretary (NAM96).

Artificial intelligence

Finnish artificial intelligence society — member 1996 – 2004, member of the board 1997 – 2001.

Bioengineering

Finnish Bioengineering club — member 1996 – 2010, member of the board 1997 – 2002, 2005 – 2008.

Housing community

As. Oy Isokaari 40 (local housing community) — member of the board 1993 – 1998, 2000 – 2011, caretaker of the bomb shelter.

Medical engineering

Polin lääketieteellisen tekniikan ammattiyhdistys (HUT's medical engineering society) — active member 1996 – 1999.

Astronomy

POLYTEKNIKKOJEN LÄHI- JA ULKOAVARUDEN XQRSIOT (HUT's astronomical society) — active member 1995 – 1999, member of the board 1996.

Hobbies

Bicycling, jogging, snowboarding, cross-country skiing.

Electronic equipment, (radio-controlled) models, handwork.

Playing the piano (free expressive improvisation), music, films, cooking.

Investigating the mysteries of nature and human.