

## Curriculum vitae for Bo Håkansson – update 2023-11-12

**Date of birth:** July 5, 1953  
**Place of birth:** Stora Sälleryd, Ekenässjön, Vetlanda, Sweden  
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### Examinations:

**Master of engineering:** Chalmers University of Technology Göteborg, Sweden 1977 (Civ. ing.)  
 Diploma thesis: *Utrustning för trådlös styrning av foderhiss*  
**Doctor of technology:** Chalmers University of Technology Göteborg, Sweden 1984  
 Thesis: *The Bone-Anchored Hearing Aid- Engineering aspects*  
**Associate professor:** Department of Applied Electronics Chalmers 1990 (Docent)

### Professional Positions:

**Graduate student** Department of Applied Electronics, Chalmers 1977-81  
**Forskarassistent** Department of Applied Electronics, Chalmers 1982-85 and 1987-89  
**Högskolelektor** CTH, 25-50% of full time 1990-2001  
**Consulting engineer** Ingemansson Ingenjörbyrå, Göteborg 1986  
 Nobelpharma, Göteborg, 50-75% of full time 1987-1996  
**Docenttjänst** CTH Department of signals and systems 2001-2003  
**Biträdande Professor** CTH Department of signals and systems 2003-2006  
**Professor** CTH Department of signals and systems 2007-

Positions at Chalmers has during various times included being: Research group leader, Head of division, Head of undergraduate studies at the department level, Head of the Masters program in Biomedical engineering, and head of the research group in Bionics.

### Research supervision (main or co-supervisor for Chalmers students):

**Doctor of technology:** Peder Carlsson/ Björnsson - Baha project 1983-1990  
 Anders Gingsjö – digital signal processing in hearing aids 1991-1997  
 Stefan Stenfelt – Bone conduction 1992-1999  
 Bill Hodgetts – BC audiology (Edmonton co-supervisor) 2003-2007  
 Sabine Reinfeldt- Bone conduction physiology 2003- 2009  
 Måns Eeg Olofsson (Sahlgrenska co-supervisor) 2007-2012  
 Hamidreza Taghavi – Implantable Baha 2009-2014  
 Anna Gund - eHealth project 2009-2011  
 Max Ortiz – Robotic arm prosthesis 2010-2014  
 Karl-Johan Fredén Jansson – MRI and BCI project 2012- 2017  
 Cristina Rigato – BCI project 2014-2019  
 Enzo Mastinu – Robotic arm project 2014-2019  
 Alexander Thesleff –Robotic leg project 2016-2021  
 Eva Lendaro – Phantom limp pain 2016-2021  
 Ann-Charlotte Persson – BCI/audibility (Sahlgrenska co-sup.) 2020-  
 Being examiner to five PhD students in the Bionics group 2021-

### Licentiate of engineering:

Anders Brandt (1989); Anders Gingsjö (1994); Stefan Stenfelt (1996); Sabine Reinfeldt (2006);  
 Hamidreza Taghavi (2012); Karl-Johan Fredén Jansson (2015); Enzo Mastinu (2017); Cristina Rigato (2017);  
 Alexander Thesleff (2019); Eva Lendaro (2020).

**Master of engineering:** Approximately 100 Master of engineering diploma theses 1978-

### ***My research areas - a brief summary 1977-2022***

My research has led to fourteen Ph.D. and ten Lic. Eng theses, and giving substantial support up to ten professor promotions. The scientific output comprises more than 100 peer reviewed articles and 18 approved patent families and two patterns. Almost all the projects regarding bone conduction hearing devices have been highly interdisciplinary and developed in a close collaboration with other research departments in particular the Department of Ear, Nose and Throat and the Department of Audiology at Sahlgrenska hospital.

Another summary would be to list, in chronological order, the product systems that have reached practical or clinical use, where I have been inventor/co-inventor: Remote control of hoists (MSc thesis; Tännö Mekaniska, Värnamo), the bone-anchored hearing aid BAHA (PhD thesis; Cochlear Bone Anchored Solutions, Göteborg), Sound suppression device for rifles (Varberger Mekanik, Varberg), Communication systems (Oiido/3M/Ortofon), Audiometric transducer B81 (Ortofon/ Interacoustics, Denmark), VEMP/ABR transducer B250 (Ortofon, Denmark), Robotic arm (Integrum, Sweden) and the Bone Conduction Implant (Oticon Medical acquired by Cochlear 2022, Göteborg).

The most successful project so far has been the BAHA system, which was my PhD project defended in 1984. In the BAHA project I was responsible for the technical development of the external unit which includes, audio processor, bone conduction transducer and the mechanical coupling to the bone anchored titanium implant as well as some accessories most importantly the Skullsimulator. The Skullsimulator (Håkansson & Carlsson 1989) is today the golden standard for measuring the output of direct bone drive bone conduction devices. The surgical treatment procedures of the BAHA system were developed by Associate professor Anders Tjellström and the implant itself was based on the osseointegration principle of titanium implants discovered by Professor P-I Brånemark. It is estimated that more than 300.000 patients (2019) have been operated with this system around the world.

As a continuation of the BAHA project I started the bone conduction implant (BCI) project in 1998. In the BCI project the complete speaker is implanted under the intact skin and thus it does not need a permanent skin penetration. The BCI system is more aesthetically appealing and is expected to have less skin issues than the BAHA system where the speaker is worn externally and is attached via a skin penetrating implant to the skull bone. First BCI patients were operated by Associate professor Måns Eeg-Olofsson 2012 and after more than twenty years of research, the BCI system has proven to be safe and effective in clinical studies and is now (2020) in the regulatory process for commercialization.

A new patented transducer technology called Balanced Electro-magnetic Separation Transducer (BEST) was invented by (priority date 2000) and is today used in the BCI devices as well as in all BAHA models from Cochlear. This transducer technology has some unique properties as compared to previous technologies offering robust design, higher output force levels and lower distortion, especially at lower frequencies. Today, the BEST technology is also commercially used in the audiometric transducer B81 (Ortofon/Interacoustics, Denmark) used in many audiology departments Worldwide.

In a project to investigate the hearing loss due to gun shots among the Swedish hunters led to my development of a new silencer named "Ijudriktare". This research also led to a change in the Swedish legislation (Jaktkungörelsen 1994:4) allowing some suppression in rifles and the Varberger Ear Guard (VEG) – a first suppression and sound directing device mounted on top of the hunting rifle. It was not promotionally ideal that VEG appeared in the film Jägarna (1996) dealing with illegal hunting. Today there are however numerous designs of silencers accepted, and they are a common accessory for hunting rifles in Sweden (unlimited suppression allowed from 2007 after a license approval) and preserving the hearing ability of the hunters.

I initiated a PhD project (Gingsjö et al. 1997) with the aim to develop digital signal processing algorithms to improve the sound comfort i.e. reduce transient sound in ordinary air conduction (*ac*) hearing aids. Most DSPs in hearing aids have today similar transient reduction algorithms implemented.

I have proposed and conducted a tinnitus project where a bone anchored sound stimulator for tinnitus relief was developed (Holgers & Håkansson 2001). The advantage using bone conduction for tinnitus masking is that ear canals can be open for normal hearing of environmental sounds. With today's digital sound processors this can easily implemented but tinnitus has a complex origin and long term effectiveness by use of masking is still unclear.

I initiated a master thesis project using GPS to follow orienteers in real time (Robertsson and Lundbäck, 2001). This project resulted in a first event in Sweden where the orienteers could be followed by spectators on

a screen when they were running in the forest. The event was presented in real time during the MSc thesis presentation with a TV4 team on site for a news report. This is today an increasing popular procedure used by TV media broadcasting orienteering competitions. As a frequent orienteer, especially at younger age (Swedish champion 1973 in night orienteering for ages up to 20 yrs) and part time paid orienteering map maker, visualizing the real time drama in the forest during an orienteering competition has, thanks to recent successful GPS and IT developments, been like an old dream come thru.

I was one of the initiators of the Robotic arm project together with Rickard Brånemark that started as a MSc project by Max Ortiz Catalan in 2008. The Robotic arm project was initially aiming to control an arm prosthesis by implanted muscle and nerve electrodes. This project has over time grown tremendously thanks to a close collaboration between Chalmers, Gothenburg University and Integrum AB. Today this project comprises not only robotic arm control but also electric nerve stimulation for feedback, virtual reality for training to control missing limb, mind control of leg prosthesis, tactile stimuli and hearing through bone conduction for feedback, phantom limb pain reduction with augmented reality. This project grown tremendously under professor Max Ortiz Catalan leadership and gained extraordinary scientific media attention, honorary prizes and extensive research grants.

In 2015 I initiated a new project regarding new transducer to improve a diagnostic method of various disorders of the vestibular labyrinth commonly experienced as dizziness or vertigo symptoms. This transducer was called B250 and incorporates a BEST with low frequency emphasis which is used to evoke so called vestibular evoked myogenic potentials (VEMP). Results are very promising (Håkansson et al. 2018) and a commercialization is planned by Ortofon A/S. Lately the B250 has been successfully used in ankle audiometry for identifying semicircular canal dehiscence syndrome and also been proposed for vibrational induced Nystagmus. These projects are running in close collaboration with the Karolinska institute headed by our present post-doc Luca Verrecchia.

### ***Major research grants***

Benförankrad hörapparat (1982-85):	STU 82-3267, 83-3531, 84-4326 A+B
Reduktion av transienta störljud i hörapparat (1987-96):	NUTEK 87-04037, 89-01719-5
Människoskallens ljudtransmissionsegenskaper (1992-96):	TFR 92-721, 93-921, 95-411, 96-717
Inverkan av mellan- och inneröra på benlett ljud (2001-03),	TFR 2000-576
Hearing and communication in extreme environments (2003-05),	VR 621-2002-5624
The effect of the acoustic reflex on the hearing of one's own voice (2005)	Oticonfonden
Bestämning av egna röstens benledningskomponent (2008)	Stingerfonden
Own voice (2008)	HRF
Development of a bone conduction implant (2009-12)	Vinnova 2009-00190
Bone conduction implant - Animal study (2010)	HRF
Hearing implant without skin penetration (2012-2014)	VR 621-2012-5272
Clinical study – Bone Conduction Implant 2013	HRF
Clinical study – Bone Conduction Implant 2013	Promobilia
BCI; Cristina – co applicant 2014-2017	VR 621-2013-6027
Robotic arm; Enzo – Industri dokt 2014-2017 Integrum	VR 621-2013-5749
Implanterbara hörapparater 2015	Promobilia 15112
Yrselprojektet Medtech4Health, 2016-2018	Vinnova 2016-02302
Robotic leg prosthesis Thesleff - Industridoktorand Integrum –	SSF ID15-0089
Vestibular evoked myogenic potential 2017	HRF 2017-552
Förbättrade metoder för yrseldiagnos med benledningsstimulering, 2020	Promobilia
Post doc grant for Luca Verrecchia 2021	Promobilia

### ***Membership in Professional Societies:***

Sveriges teknikers audilogiska förening (STAF); Svenska vibrationsföreningen (SVIB); Acoustical society of America (ASA); Biomaterials Group, Dept. of Handicap Research, University of Göteborg Biomaterialcentrum (BRC)

***Awards and Honorary appointments:***

For the pioneering work with the bone anchored hearing aid and prosthetic control:

First prize in <i>Innovation cup</i> by Dagens Industri och Skandia	1988
Certificate of commendation in <i>IEE Prize for Helping Disabled people</i>	1989
Honorary Membership of <i>British Facial and Audiological Implant Group</i>	1994
Tjellström Award, iRSM Edmonton Canada	2011
Erna Eberlings Award, Svenska läkaresällskapet	2011
Silverörat, Svenska audiologiska sällskapet	2012
Årets tekniker, Svenska handelskammaren	2013
Gustav Dahlen medaljen, Chalmers ingenjörsförening	2016
ISPO Blatchford Award, at 16th World Congress	2017
Otto Schmitt Award, at IFBME world congress in Pragh	2018
The Best Paper Award, Annals of Biomedical Engineering	2018
Honory doctor at Sahlgrenska Academy, Gothenburg University	2020

***Other qualifications:*****Faculty opponent PhD thesis and Half time/Lic eng evaluator:**

Johan Hellgren, "Compensation for hearing loss and cancellation of acoustic feedback in hearing aids", Department of Neuroscience and Locomotion, Division of technical Audiology, Linköpings Universitet, Linköping, Sweden (Mars 2000).

Wael Alien, Half time seminar, Sahlgrenska University hospital.

You Chang, Half time seminar, Jan 2016, Linköpings University.

**E a member of the evaluation committee for PhD thesis's presented by:**

Lennart Magnusson, "Using the Speech Intelligibility Index for Evaluating Speech Test Results and Hearing Aid Characteristics", Audiologiska avdelningen, Göteborgs universitet (2000).

Jun Chen, "Signal Processing Approaches on Otoacoustic Emissions", Department of Neuroscience, Unit of Technical and Clinical Audiology, Karolinska Institutet, Stockholm (2000).

Harald Gustavsson, "Speech enhancement for Mobile Communications", Department of Telecommunications and Signal Processing, Blekinge Institute of Technology, Ronneby (2002).

William Hodgetts, Contributions to a Better Understanding of Fitting Procedures for Baha, University of Alberta, (2007).

Ulrike Richter, Spatial Characterization and Estimation of Intracardiac Propagation Patterns During Atrial Fibrillation, vol 27, ISSN: 1654-790X, Lund (2010).

**Expert evaluator in the appointments of:**

Teknologie doktor Thomas Lunner, till Adjungerad Universitetslektor i Teknisk Audiologi, Institutionen för teknisk audiologi, Linköpings Universitetssjukhus (2000).

Adjunkt Samir Y. Yousif Al-Mulla till lektor i ämnet Elektronik vid Högskolan i Borås (1999).

Biträdande lektor Fernando Seoane i medicinteknik med inriktning mot funktionella textila material vid Högskolan i Borås (2009).

**Expert evaluator of the EU RTD programme GROWTH**

The CRAFT evaluation, Brussels, October 1999.

**Member of scientific committee/Vetenskapligt råd**

Hörsselforskningsfonden- Hörselskadades riksförbund (HRF) 2007-2018

Promobilias vetenskapliga råd 2023-

**Industrial collaboration:**

<i>Nobelpharma AB, Göteborg</i>	Consultant	50%	1987-96
<i>Ingemansson Akustik och Mekanik, Göteborg</i>	Consultant	100%	1986
<i>Tännö mekaniska verkstad AB, Värnamo</i>	Project co-operation		1977-84
<i>Varbergs precision AB, Varberg,</i>	Chairmen of the board		1985-96
<i>Cochlear Bone Anchored Solution/Entific</i>	Project co-operation		1997-2010
<i>Oiido AB, Göteborg</i>	Founder and member of the board,		2003-2010
<i>P&amp;B Research AB, Göteborg</i>	Founder		1985-2010
<i>Osseofon AB, Göteborg</i>	Founder		1997-
<i>Interacoustics A/S, Denmark</i>	Research collaboration		2005-
<i>Med-El, Österrike</i>	Research collaboration		2006-2008
<i>Ortofon A/S, Denmark</i>	Research collaboration		2009-
<i>Integrum AB, Göteborg</i>	Research collaboration		2009-
<i>Oticon Medical AB, Göteborg</i>	Research collaboration		2014-2022
<i>Audio scan Inc, Canada</i>	Research collaboration		2020-

**Interdisciplinary research collaboration**

<i>Öronkliniken, Sahlgrenska sjukhuset, Göteborg, Sweden</i>	1977-
<i>Hörselvårdskliniken, Sahlgrenska sjukhuset, Göteborg, Sweden</i>	1977-
<i>Department of Speech Pathology and Audiology, University of Alberta, Edmonton, Canada</i>	2003-
<i>COMPRU/ iRSM, Edmonton, Canada</i>	2003-
<i>Radboud University, Nijmegen, Holland</i>	2011-
<i>Halle, Germany</i>	2014-

**Lectures and related staff work:****Lecturer and examiner in:**

<b>Various micro electronic courses</b> for F2, D3, E2, E3, E4	1986, 1990-2010, 2017-19
<b>Biomedical instrumentation/medicinsk elektronik</b> for E4, MPBME	2006 - 2010
<b>Examiner and organizer of Medicine for the engineer/Medicin för tekniker</b>	2001-2017
<b>Development compulsory PSpice laboratory exercises</b> for E1, F2, D2 and Z2	1998-2010
<b>Director of Studies</b> at the Department of Signals and Systems (studierektor)	1998-2003
<b>Masters program coordinator</b> – Biomedical engineering	2004-2006
<b>Head of division: Biomedical engineering</b>	2004-2007
<b>Head of research group: Biomedical signals and systems</b>	1998-2017
<b>Member of MC2 board – Rektors representant</b>	2014-2018

## Publications and patent list

### 1. Peer reviewed full papers and significant conference papers

1. Tjellström, A., **Håkansson**, B., Lindström, J., Brånemark, P-I., Hallén O., Rosenhall, U. and Lejon, A., 1980, Analysis of the mechanical impedance of bone-anchored hearing aids. *Acta. Otolaryngol.* 89:85-92.
2. Tjellström, A. and **Håkansson**, B., 1981, The Bone-anchored hearing aid. *Hearing aid journal*, October, 10-32.
3. **Håkansson** B. 1984: The bone-anchored hearing aid: engineering aspects, thesis, Tech. Rep. 144, School of Electrical Engineering, Chalmers University of Technology, Göteborg, Sweden.
4. **Håkansson**, B., Tjellström, A., and Rosenhall, U., 1984, Hearing Thresholds with Direct Bone Conduction Versus Conventional Bone Conduction. *Scand. Audiol.* 13:3.
5. **Håkansson**, B., Tjellström, A., Rosenhall, U. and Carlsson, P., 1985, The Bone-Anchored Hearing Aid: Principle design and a psychoacoustical evaluation. *Acta. Otolaryngol.* 100:229-239.
6. **Håkansson**, B., Tjellström, A., and Rosenhall, U., 1985, Acceleration levels at Hearing Threshold with Direct Bone Conduction Versus Conventional Bone Conduction. *Acta Otolaryngol.* 100:240.
7. **Håkansson**, B., 1985, Den benförankrade hörapparaten - "Jag känner ingen apparat, jag bara hör". *AudioNytt*, Nr 1.
8. Carlsson, P., **Håkansson**, B., Rosenhall, U. and Tjellström, A., 1986, A speech to noise ratio test with the bone-anchored hearing aid - a comparative study. *Otolaryngology Head & Neck Surgery*, 94/4, 421-426.
9. **Håkansson**, B. Carlsson, P. and Tjellström, A., 1986, The mechanical point impedance of the human head, with and without skin penetration. *Journal of the Acoustic Society of America*, 80(4), 1065-1075.
10. **Håkansson**, B. and Carlsson, P., 1987, Bias errors in mechanical impedance data obtained with impedance heads. *Journal of Sound and Vibration*, 113, 173-183.
11. **Håkansson**, B. and Carlsson, P., 1989, Skull simulator for direct bone conduction hearing devices. *Scandinavian Audiology*, 18, 91-98.
12. **Håkansson**, B., Tjellström, A. and Carlsson, P., 1990, Percutaneous vs transcutaneous transducers for hearing by direct bone conduction. *Otolaryngology Head & Neck Surgery*, 102: 339-344.
13. **Håkansson**, B., Lidén, G., Tjellström, A., Ringdahl, A., Jacobsson, M., Carlsson, P. and Erlandson, B.E., 1990, Ten years of experience with the Swedish bone-anchored hearing system. *Annals of Otolology, Rhinology & Laryngology*, 99(10), Suppl 151, Part 2.
14. **Håkansson**, B., Carlsson, P., Tjellström, A., and Lidén, G., 1994, The bone-anchored hearing aid: Principal design and audiometric results, *ENT Journal*, (73)9, p 670-675.
15. **Håkansson**, B., Brandt, A., Carlsson, P. and Tjellström, A, 1994, Resonance frequencies of the human skull in vivo. *J. Acoust. Soc. Am.* 95 (3).
16. Carlsson, P., **Håkansson** B, and Ringdahl A, 1995, *Force threshold for hearing by direct bone conduction.* *J Acoust Soc Am*, 1995, 97(2), 1124-1129.
17. Tjellström, A., and **Håkansson**, B. 1995, *The bone-anchored hearing aid - design principles, indications, and long-term clinical results*, *Otolaryngologic Clinics of North America*, Vol. 28, No 1, pp 15.1 -- 15.20.
18. **Håkansson** B, Gingsjö A, 1995, Hörselskyddsanvändning, skottljudsbelastning, hörselproblem och attityder till hörselskydd bland Sveriges jägare. Technical Report 1:95, Laboratory of Medical Engineering, Chalmers University of Technology, Göteborg, Sweden, 1995. ISBN 91-7546-068-8.
19. **Håkansson**, B., Carlsson, P. Brandt, A., and Stenfelt, S., 1996, *Linearity of sound propagation through the human skull in vivo*, *J. Acoust. Soc. Am.* 96 (4).
20. Stenfelt, S., and **Håkansson**, B., 1996, *Air versus bone conduction: An equal loudness investigation*, *J. Acoust. Soc. Am.* 100 (4), Pt. 2, 2720. Abstract.
21. Carlsson, P. and **Håkansson** B E V, 1997, *The bone-anchored hearing aid: Reference quantities and functional gain.* *Ear & Hearing*, 1997, 18/1, 34-41.
22. **Håkansson** B, Gingsjö A, 1997, Hearing condition and ear protection among Swedish hunters in relation to sound exposure from gun shots, In PhD thesis by Gingsjö, A., On transient noise and its reduction in hearing aids, Technical report No 319, School of Electrical Engineering, Chalmers University of Technology, Göteborg, Sweden. ISBN 91-7197-544-6.

23. Gingsjö, A., **Håkansson**, B., Carlsson, P., 1997, Properties and detection of transient noise in an everyday environment, In PhD thesis by Gingsjö, A., On transient noise and its reduction in hearing aids, Technical report No 319, School of Electrical Engineering, Chalmers University of Technology, Göteborg, Sweden. ISBN 91-7197-544-6.
24. **Håkansson**, B., and Carlsson, P., 1998, *The bone-anchored hearing aid*, in *Osseointegration in Craniofacial Reconstruction*, edited by P.-I. Brånemark and D. Tolman, Quintessence Publishing Co. Inc., Chicago, 311-326.
25. Stenfelt, S., and **Håkansson**, B., 1998, *A miniaturized Artificial Mastoid Using a Skull Simulator*. *Scand. Audiol.* 27 (2), 67-76.
26. Stenfelt, S., and **Håkansson**, B., 1999, *Characteristics of bone conducted sound*, *J. Acoust. Soc. Am.* 105 (2), Pt. 2, 1084. Abstract.
27. Stenfelt, S., and **Håkansson**, B., 1999, *Sensitivity to bone-conducted sound: Excitation of the mastoid vs the teeth*, *Scand. Audiol.* 28(3), 190-198
28. Stenfelt, S., **Håkansson**, B., Jönsson, R., and Granström, G., 2000, *A bone-anchored hearing aid for patients with pure sensorineural hearing impairment – a pilot study*, *Scand Audiol*, 2000;29:175-185.
29. Stenfelt, S., **Håkansson**, B., and Tjellström, A., 2000, *Vibration characteristics of bone conducted sound in vitro* *J. Acoust. Soc. Am.* 107(1), 422-431.
30. Holgers, K.M., and **Håkansson**, B., 2001, *Titanium in audiology*, in *Titanium in medicine*, edited by D.M. Brunette, P. Tengvall, M. Textor and P. Thomsen, Springer, Berlin, 909--928.
31. Tjellström, A., **Håkansson**, B. and Granström, G. 2001, *The bone-anchored hearing aids – Current status in adults and children*, *Otolaryngologic Clinics of North America*, Vol. 34, No 2, pp 337 -- 364
32. Holgers, K.M., and **Håkansson**, B., 2002, *Sound stimulation via bone conduction for tinnitus relief: A pilot study*. *Int J of Audiol.* 41(5), 293-300.
33. Stenfelt, S., and **Håkansson**, B., 2002, *Air versus bone conduction: An equal loudness investigation*, *Hear. Res.*, 167(1-2), 1-12.
34. Priwin C, Stenfelt S, Edensvärd A, Granström G, Tjellström A, **Håkansson** B. An Evaluation of Bilateral Bone-anchored Hearing Aids. *Otolaryngol, Head, Neck Surg.* 2002;127:217.
35. Eeg-Olofsson M, Stenfelt S, Granström G, **Håkansson** B, Tjellström A. Bone Conduction Implant – BCI: A feasibility study for an implanted BCI. *Otolaryngol, Head, Neck Surg.* 2002;127:229-230.
36. Priwin C, Edensvärd A, Granström G, **Håkansson** B, Stenfelt S, Tjellström A. En audiologisk utvärdering av dubbelsidig benförankrad hörapparat, (BAHA). *Acta Soc. Med. Suec* 2002;111;1:265-266.
37. Eeg-Olofsson M, Granström G, **Håkansson** B, Stenfelt S, Tjellström A. Implanterbar BAHA. *Acta Soc. Med. Suec* 2002;111;1:265.
38. **Håkansson**, B., 2003, *The balanced electromagnetic separation transducer- A new bone conduction transducer*. *J. Acoust. Soc. Am.* 113 (2).
39. Priwin, C., Stenfelt, S., Granström, G., Tjellström, A., **Håkansson**, B., 2004 *Bilateral Bone-Anchored Hearing Aids (BAHAs): An audiometric evaluation*, *Laryngoscope* 114, 77-84.
40. Priwin, C., Stenfelt, S., Edensvard, A., Granström, G., Tjellström, A., and **Håkansson**, B., 2005, *Unilateral versus bilateral bone-anchored hearing aids (BAHAs)*, *Cochlear Implants Int.* 6, suppl. 1, 79-81.
41. Reinfeldt, S., Stenfelt, S., and **Håkansson** B, 2006, *Transcranial transmission of bone conducted sound measured acoustically and psychoacoustically.*, *Proceeding of the 4th International Symposium of Middle Ear Mechanics in Research and Otology*, Zürich, Switzerland, 2006: 276-281.
42. **Håkansson**, B., 2006, "Technical development of the BAHA - A historical review covering the first twenty years". *Firmly Anchored, Baha Users Support (Kent)*, Issue 17. Autumn 2006.
43. Reinfeldt, S., Stenfelt, S., Good, T., and **Håkansson**, B., 2007, *Bone conduction transmission from a sound field estimated by thresholds, ear canal pressure and skull vibrations*, *J Acoust Soc Am.* 121(3): 1576-1587.
44. **Håkansson** B., Måns Eeg-Olofsson, Sabine Reinfeldt, Stefan Stenfelt, and Gösta Granström, 2008, *Percutaneous Versus Transcutaneous Bone Conduction Implant System: A Feasibility Study on a Cadaver Head*. *Otology and Neurology* 29, 1132-1139.

45. **Håkansson B.**, Sabine Reinfeldt, Måns Eeg-Olofsson, Per Östli, Hamidreza Taghavi, Johannes Adler, John Gabrielsson, Stefan Stenfelt, Gösta Granström, *A novel bone conduction implant (BCI) – engineering aspects and preclinical studies*, *International journal of audiology*, March 2010, Vol. 49, No. 3 , Pages 203-215.
46. Sabine Reinfeldt, Per Östli, **Bo Håkansson** and Stefan Stenfelt, *Hearing one's own voice during phoneme vocalization—Transmission by air and bone conduction*, *J. Acoust. Soc. Am.* 128 (2), August 2010.
47. Måns Eeg-Olofsson, Stefan Stenfelt, **Bo Håkansson**, Hamidreza Taghavi, Sabine Reinfeldt, Per Östli, Gösta Granström. 2011. *Optimal position of a new bone conduction implant*, *Cochlear implants international*, 12 (Suppl 1), S136-8.
48. Hodgetts W. E.; Hagler P.; **Håkansson B.**; Soli S.; 2010, *Technology-Limited and Patient-Derived Versus Audibility-Derived Fittings in Baha Users: A Validation Study*. *Ear and Hearing*;31;1-9.
49. Hodgetts William E., **Håkansson Bo E.V.**, Hagler Paul, Soli Sigfrid, 2010, *A comparison of three approaches to verifying aided Baha output*, *International Journal of Audiology*; 49: 286–295.
50. **Håkansson B.**, 2011, *The future of bone conduction hearing devices*, *Adv Otorhinolaryngol. Basel, Karger*, vol 71, pp 140-152.
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44. Reinfeldt, S., Östli, P., Stenfelt, S., and **Håkansson, B.** (2009), "Differences in bone and air conduction transmission of one's own voice during phoneme vocalization" , International Symposium on Bone Conduction Hearing - Craniofacial Osseointegration, Göteborg, Sweden.
45. Östli P.; **Håkansson B.**; Reinfeldt S.; Taghavi H., (2009), "Optimization of the BEST transducer for a transcutaneous bone conduction hearing system", 2<sup>nd</sup> International Symposium on Bone Conduction Hearing - Craniofacial Osseointegration, Göteborg, Sweden.
46. Taghavi, H.; **Håkansson, B.**; Reinfeldt, S.; Östli, P., (2009), Radio Frequency (RF) power management and speech signal transmission in a wireless solution for Transcutaneous Bone Conduction Implant Systems,
47. Esmaeili, S.; Arjomand, A.; Stalfors, J.; Östli, P.; **Håkansson, B.**; Eeg-Olofsson, M.; Granström, G., (2009), Geometrical analysis of temporal bone for Bone Conduction Implant, 2<sup>nd</sup> International Symposium on Bone Conduction Hearing - Craniofacial Osseointegration, Göteborg, Sweden.
48. Bosman, A; **Håkansson, B**; Bance, M; Hodgetts, B; Snik, A; Stenfelt, S. (2009), Bone conduction physiology, sound propagation, 2nd International Symposium on Bone Conduction Hearing - Craniofacial Osseointegration, Göteborg, Sweden.
49. **Håkansson, B.**; Mylanus, E., Bance, M., Hodgetts, B., Soli, S, Stenfelt, S. àWengen, D., (2009), Panel on BAHA and implantable hearing aids in the future, 2<sup>nd</sup> International Symposium on Bone Conduction Hearing - Craniofacial Osseointegration, Göteborg, Sweden.
50. Granström, G.; **Håkansson, B.**; Eeg-Olofsson, M., (2009), Transcutaneous Bone Conduction Implant (BCI). Surgical and Audiological aspects, 2<sup>nd</sup> International Symposium on Bone Conduction Hearing - Craniofacial Osseointegration, Göteborg, Sweden.
51. **Håkansson, B.**; STAF dagarna, 17-19 March, 2010, Eskilstuna.
52. **Håkansson, B.**; Audionomdagarna, 27-28 May, 2010, Västerås.
53. Taghavi H., **Håkansson, B.**, Reinfeldt S., Eeg-Olofsson M., Granström G.; A Novel Bone Conduction Implant (BCI) System, CI 2010, 30/6-3/7, 2010, Stockholm.
54. Taghavi H., **Håkansson, B.**, Reinfeldt S., Eeg-Olofsson M., Granström G.; A Novel Bone Conduction Implant (BCI) System, IHCON 2010, 11-15 August, Lake Tahoe, USA.
55. Östli P., **Håkansson B.**, Lundgren H., Reinfeldt S., Taghavi H., Variability in Bone Conduction Force Output Due to Intersubject Differences in Mechanical Impedance of the Skin, IHCON 2010, 11-15 August, Lake Tahoe, USA.
56. **Håkansson, B.**; Young Scientist Forum, 22 September, 2010 Göteborg.
57. **Håkansson, B.**; Läkarestämman - Årsmöte Medicinsk teknik och fysik, 1 December 2010, Göteborg.
58. **Håkansson Bo.**, "Bone Conduction Hearing Devices: Past, Present and Future. Third International Symposium on Bone Conduction Hearing – Craniofacial Osseointegration, 23-26 March, 2011, Sarasota USA (Invited presentation).
59. Taghavi H; **Håkansson B**; Reinfeldt S; Östli P; Eeg-Olofsson M. "A Novel Bone Conduction Implant (BCI) System", Third International Symposium on Bone Conduction Hearing – Craniofacial Osseointegration, 23-26 March, 2011, Sarasota USA (presentation).
60. Eeg-Olofsson Måns, **Håkansson Bo**, Taghavi Hamidreza, Reinfeldt Sabine, Östli Per, Tengstrand Tomas, Stenfelt Stefan. "Correlation between the cochlear promontory and hearing perception-a pilot study", Third International Symposium on Bone Conduction Hearing – Craniofacial Osseointegration, 23-26 March, 2011, Sarasota USA (poster).
61. Per Östli, Joacim Stalfors, **Bo Håkansson**, Lennart Svensson, Sabine Reinfeldt, Måns Eeg-Olofsson, Hamidreza Taghavi. "Study of the Feasible Size of a Bone Conduction Implant (BCI) in the Temporal Bone", Third International Symposium on Bone Conduction Hearing – Craniofacial Osseointegration, 23-26 March, 2011, Sarasota USA (poster).

62. Reinfeldt S; Östli. P; **Håkansson B**; Taghavi H; Stenfelt S. "Hearing One's Own Voice, Sensitivity Difference between Bone and Air Conduction Transmission", Third International Symposium on Bone Conduction Hearing – Craniofacial Osseointegration, 23-26 March, 2011, Sarasota USA (poster).
63. **Håkansson B.**; Vinnova konferens, "Innovationer för framtidens hälsa", 20 oktober, 2011
64. **Håkansson, B**; HRF Kungsbacka, 27 oktober 2011, Kungsbacka.
65. **Håkansson, B**; Läkarsämman- Årsmöte Medicinsk teknik och fysik, Erna Ebelings pris, 30 November 2011, Stockholm.
66. Hamidreza Taghav, **Bo Håkansson** et al: "A novel bone conduction implant – Analog radio frequency data and power link design", Biomed 2012, Innsbruck, Austria.
67. **Bo Håkansson**: TeMA Hörsel Linköping "Bone Conduction Hearing Devices In The Future", mars 2012.
68. Sabine Reinfeldt, **Bo Håkansson** et al, TeMA Hörsel Linköping, "Transkutan benledningskänslighet för normalhörande", mars 2012.
69. Hamidreza Taghavi, **Bo Håkansson** et al., TeMA Hörsel Linköping, "A Novel Bone Conduction Implant (BCI) System", mars 2012.
70. Måns Eeg-Olofsson, **Bo Håkansson** et al: CI 2012, Baltimore USA, "Transmission of bone conducted sound etc", april 2012.
71. Sabine Reinfeldt, **Bo Håkansson** et al, CI 2012, Baltimore USA, "Bone Conduction Hearing Sensitivity in Normal Hearing Subjects – Transcutaneous at BAHA vs BCI position", maj 2012.
72. **Bo Håkansson** et al: CI 2012, Baltimore USA, "The Bone Conduction Implant (BCI)", april 2012.
73. Hamidreza Taghavi, **Bo Håkansson** et al, CI2012, Baltimore, USA, "Feedback analysis in PBCD and BCI on a dry skull", april 2012.
74. Sabine Reinfeldt, **Bo Håkansson** et al: OM 2012, Amsterdam Holland, "A Novel Bone Conduction Implant (BCI) Device", Sept 2012.
75. Ortiz-Catalan, M., Håkansson, B., and Brånemark, R., Advanced prosthetic control through an osseointegrated bidirectional interface, Medicinteknikdagarna, Oct 1-2, 2013, Stockholm, Sweden.
76. **Bo Håkansson**, STAF March 2013, Invited talk
77. **Bo Håkansson**, HRF Falkenberg, March 2013, Invited talk
78. M. Ortiz-Catalan, **B. Håkansson**, and R. Brånemark, "Real-time classification of simultaneous hand and wrist motions using Artificial Neural Networks with variable threshold outputs," in Accepted in Proceedings of the XXXIV International Conference on Artificial Neural Networks (ICANN), 2013.
79. Osseo 2013, Newcastle, co-author in 8 peer reviewed abstracts – all accepted for oral presentation (Feb 2013).
80. **Bo Håkansson**, Biomaterials for tomorrow, Oct 2013, Chalmers, Gothenburg.
81. **Bo Håkansson**, A bone conduction implant with implanted transducer, Int journal of International Advanced Otolology, vol 9, no 3, suppl 1, presented at 29 th Politzer meeting, Antalya, Turkey (Invited talk), 2013 .
82. **Bo Håkansson**, Måns Eeg Olofsson, *The Bone Conduction Implant*, Oticon Medical symposium, Jan 2014, Copenhagen.
83. **Bo Håkansson**, Karl-Johan Freden Jansson, *Framtidens hörapparater*, Vetenskapsfestivalen, maj 2014, Göteborg.
84. **Bo Håkansson**, *BAHA history*, Medicinteknikdagarna, October 2014, Gothenburg.
85. **Bo Håkansson**, *BCI development*, Medicinteknikdagarna October 2014, Gothenburg.
86. **Bo Håkansson**, *Framtidens benledningshörapparater*, HRF Malmö, årsmöte October 2014, Malmö.
87. **Osseo meeting 2015 Lake Louise Canada**: Invited talk, Oticon symposium + seven abstracts
88. **Bo Håkansson** Symposium, invited talk, iRSM, Edmonton 2015
89. **Bo Håkansson** Invited talk MedTechWest 2015



90. Ortiz-Catalan, M., Gudmundsdottir, R., Kristoffersen, M., Zepeda-Echavarria, A., **Håkansson, B.** and Brånemark, R., Promotion of Motor Execution via Myoelectric Pattern Recognition and Augmented/Virtual Reality as a Treatment of Phantom Limb Pain, 9th Congress of the European Federation of Pain (EFIC), Sep 2-5, 2015, Vienna, Austria.
91. **Bo Håkansson - Three invited talks 2016:** Promobilia Stockholm, HRF Hörselkonferensen, Linköping, MedTech West Göteborg.
92. Mastinu, E., Ortiz-Catalan, M., and **Håkansson, B.**, Digital Controller for Artificial Limbs fed by Implanted Neuromuscular Interfaces via Osseointegration, Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, August 16-20, 2016, Orlando, Florida, U.S.A., 2016.
93. Mastinu, E., **Håkansson, B.**, and Ortiz-Catalan, M., \_Digital Controller for Artificial Limbs fed by Implanted Neuromuscular Interfaces via Osseointegration, Proceedings of the Trent International Prosthetic Symposium, September 28-30, 2016, Glasgow, Scotland, U.K., 2016.
94. **Osseo 2017**, Nijmegen, six abstracts.
95. **Bo Håkansson - Six invited talks 2017:** Oticon symposium Copenhagen; Cochlear symposium Stockholm; Gustav Dahlen seminar, Gothenburg; Oticon symposium Osseo 2018 Nijmegen; Edmonton seminar, Canada via Skype; Medtech West VEMP – MedTech4Health, Gothenburg.
96. STAF 2017: **Bo Håkansson** Yrselprojektet
97. Mastinu, E., **Håkansson, B.**, and Ortiz-Catalan, M., \_Embedded Controller for Pattern Recognition and Neural Stimulation via Osseointegration, Proceedings of the 16th World Congress from the International Society for Prosthetics and Orthotics, May 8-11, 2017, Cape Town, South Africa, 2017.
98. M. Ortiz-Catalan, E. Mastinu, R. Brånemark, **B. Håkansson**, in XVI World Congress of the International Society for Prosthetics and Orthotics (ISPO), (Cape Town, 2017).
99. Mastinu E., **Håkansson B.**, and Ortiz-Catalan M., Low-cost, open source bioelectric signal acquisition system, 14th International Conference on Wearable and Implantable Body Sensor Networks, Eindhoven, May 9-12, 2017.
100. STAF 2018– 5 Abstracts; Barany XXX 2018 Uppsala – 2 abstracts;
101. IFMBE 2018, Pragh, Otto Schmitt Award lecture
102. Invited lecture at Henry Wallman Award ceremony August 2018
103. Invited lecture Edmonton Canada, 25 years celebration, feb 2019
104. Invited lecture Rotary, Göteborg, Mars 2019
105. Poster presentation at ESPCI, Bukarest, Rumänien, Oct 2019.
106. Two presentations with peer review abstracts Osseo 2019, Miami.
107. HNO Plotke et al. 2022
108. Barany XXXI Madrid 2022: Four contributions Bo et al., Karl-Johan et al., Luca et al., Plontke et al.
109. Heal 2022, Italy: Sabine et al., Karl-Johan et al., Luca et al.
110. ARO 2022, Plontke et al.

#### 4. Patents

I am first name in all patent families and patterns below. These patent families have been approved and modified in different countries, thus multiplied in numbers, but only the first and priority patent in these families are listed below which is typically in Sweden.

1.	Patent No: 81-07161-5	A coupling for bone conduction hearing aids	1981
2.	Patent No: 82-00702-2	A transient reduction device	1982
3.	Patent No: 85-02341-4	An implantable transducer	1985
4.	Patent No: 85-02426-3	A damped spring suspension	1985
5.	Patent No: 85-02411-5	Test equipment for direct bone conduction devices	1985
6.	Pattern No: 49086	Bayonet coupling	1992
7.	Pattern No: 950772	Sound suppression device- Earguard	1995
8.	Patent No: 95-850212-2	Snap coupling - flexible male element	1995
9.	Patent No: 94-04189-4	Snap coupling - release mechanism	1995
10.	Patent No: 97-02164-6	An integral implant system	1997
11.	Patent No: 97-04752-6	A percutaneous electrical coupling	1997
12.	Patent No: 0000810-2	An electromagnetic transducer (Vib I)	2000
13.	Patent No: 0201441-3	Arrangement in electromagnetic transducer (Vib II)	2002
14.	Patent No: 0600843-7	Assembly method electromagnetic transducer (Vib III)	2006
15.	Trademark No: 380722	BEST	2006
16.	Patent No: 0702894-7	Fitting of direct bone conduction devices	2007
17.	Patent No: 0800390-7	Implantable bone conduction transducer (Vib IV)	2008
18.	Patent No: 0900372-4	Mechanical HF boost (Vib V)	2009
19.	Patent No: 1001105-4	Electrical HF boost (Vib VI)	2010
20.	Patent No: 1000876-1	Miniaturized transducer (Vib VII)	2010
21.	Patent No: 1300529-3	Electric coupling	2013