

Ari Henrik Sihvola
--------------------

○ ● ● ● ○

Professor of electromagnetics, Aalto University, School of Electrical Engineering  
 Department of Radio Science and Engineering  
 born 6 October 1957; Valkeala, FINLAND

---

## Engineering education

*Doctor of Technology.* 3 March 1987  
 (Helsinki University of Technology, Department of Electrical Engineering)  
*Thesis:* Analysis of microwave structures and mixing formulae with applications  
 to remote sensing measurements.

*Licentiate of Technology.* 17 November 1984  
 (Helsinki University of Technology, Department of Electrical Engineering)

*Diploma Engineer.* 1 September 1981  
 (Helsinki University of Technology, Department of Electrical Engineering)

## Work career

1.8.2005 — 31.7.2010	Academy Professor, Academy of Finland
1.8.2000 — 31.7.2001	Sabbatical leave
1.2.1997 — 31.7.2004	Director of the Electromagnetics Laboratory, TKK. (Except sabbatical year 2000–01.)
1.2.1997 —	Professor of Electromagnetics, Helsinki University of Technology (TKK) (From 2010, Aalto University.)
1.8.1995 — 31.1.1997	Senior Researcher, Academy of Finland
1.8.1992 — 31.7.1995	Senior Scientist, Academy of Finland
1.7.1991 — 30.6.1992	TKK, Department of Electrical Engineering; acting professor
1.2.1991 — 30.6.1991	Academy of Finland; acting senior scientist
1.8.1990 — 31.7.1995	TKK, Electromagnetics Laboratory; chief assistant
1.8.1990 — 31.10.1990	Academy of Finland; acting senior scientist
1.10.1980 — 31.7.1990	TKK; assistant, acting chief assistant, acting associate professor; (several different periods)
2.6.1980 — 31.7.1980	AEG-Telefunken, Backnang, Germany; apprentice
1.6.1979 — 31.7.1979	AEG-Telefunken, Ingolstadt, Germany; apprentice
1.6.1978 — 18.8.1978	AEG-Kanis, Essen, Germany; apprentice
23.5.1977 — 4.8.1977	Nokia Cable Factories, Pikkala, Finland; apprentice

## Research work abroad

1.5.2015 — 30.6.2015 University of Rome “La Sapienza”, Department of Information Engineering, Electronics, and Telecommunications; visiting scientist

14.9.2014 — 28.9.2014 Harbin Institute of Technology, China; visiting scientist

1.6.2008 — 30.6.2008 University of Paris 11, Laboratoire de Génie Électrique de Paris, France; visiting professor

13.9.2000 — 5.8.2001 Swiss Federal Institute of Technology, Lausanne, Electromagnetics and Acoustics Laboratory, Switzerland; visiting professor

1.4.1996 — 23.12.1996 University of Lund, Department of Electromagnetic Theory, Sweden; visiting scientist

24.9.1990 — 24.1.1991 Pennsylvania State University, Department of Engineering Science and Mechanics, University Park, USA; visiting scientist

1.9.1985 — 15.8.1986 Massachusetts Institute of Technology, Research Laboratory of Electronics, Cambridge, Massachusetts, USA; visiting engineer

### Academic positions

1985—1986 Fellow of the Advanced Study Program, Center for Advanced Engineering Study, Massachusetts Institute of Technology, USA

1988—1997 Docent (Electromagnetics; Helsinki University of Technology)

1990— Electromagnetics Academy, member, Fellow 2007

### University committees

1982—1983 Electrical Engineering Department Council (TKK), assistant member

1983—1985 secretary, committee of the postgraduate studies of the E.E. Dept., (TKK)

1986—1990 member, committee of the undergraduate studies, E.E. Dept., (TKK)

1988—1991 E.E. Dept. Council (TKK), personnel member

1990—1992 member, committee of the electrical engineering curriculum (TKK)

1990—1992 member (chairman 1991–92) of the committee on research and postgraduate education, E.E. Dept. (TKK)

1994 member, committee on the development of the electrical engineering education (TKK)

1997—1998 member of the ad hoc Committee of teaching questions in TKK

1997—2000 member, TKK dissertation committee

1997— member, Scientific Council of the ECE Department of TKK

1999—2000 supplementary member of the research council of TKK

1998—2004 chairman of the Committee for Quality of teaching in the ECE Department of TKK (OpLaa Committee)

1999—2004 member of the committee on teaching affairs in TKK

2006—2007 member of the committee for evaluating teaching of basic studies at TKK

2008—2013 director of the Graduate School of Electronics, Telecommunications, and Automation (GETA)

1999—2009 chairman of two and member of three committees for filling professor positions (TKK)

2010 member, The Technology Committee, Aalto University

2010—2013 deputy member, Academic Affairs Committee, Aalto University

2010—2013 member, the Academic Appeals Board, Aalto University

2010–2011 member, Steering Group of the Teaching Evaluation Exercise, Aalto University

2010– member of eight Department-level Tenure Track committees (Aalto)

2011–2012 member, Aalto University School of Chemical Technology, Doctoral programme Committee

2011– member, Aalto University Tenure Track Committee

2011–2013 vice chairman, Aalto University Ethics Committee

2011–2015 Member of the Degree Committee for International Master Programmes, Aalto University School of Electrical Engineering

2011–2012 Member of the Committee for the Ceremonial Conferment of Doctoral Degrees in 2012

2013–2014 Chairman of Department-level Tenure Track Committee (Aalto)

### Administrative positions

1982—1985 IEEE (Institute of Electrical and Electronics Engineers) Student Branch Chairman, (TKK)

1989—1994 IEEE MTT & AP (Microwave Theory and Techniques & Antennas and Propagation Societies) Finland Chapter, secretary-treasurer

1995—1996 IEEE MTT & AP & ED (Microwave Theory and Techniques & Antennas and Propagation & Electron Devices Societies) Finland Chapter, chairman

1982—1983 URSI (International Union of Radio Science), Finnish national committee, acting secretary

1990—1996 URSI Finnish national committee, secretary

1993—1997 IEEE/MTT AdHoc-Committee on the development of the IEEE relations in the Eastern Europe and Former Soviet Union

1996—2005 URSI Finnish National Committee, Vice Chairman

2006— URSI Finnish National Committee, Chairman  
1997—2007 member of the board on the Finnish Academy Graduate School on Applied Electromagnetics  
1999—2006 member, International Bianisotropics Conference Committee  
2002— URSI Commission B (electromagnetic theory), Official Member representing Finland  
2001— member, URSI Commission Technical Advisory Board (B-TAB)  
2004—2006 member of the steering group of TiNa project (project with the objective of increasing the interest and amount of women into the fields of information technology in Finland (both in education and in working life); supported by the European Social Fund)  
2009— member of the governing board, Federation of the Finnish Learned Societies  
2010—2013 member, Finnish national committee of IUHPS Division of History of Science and Technology  
2011— member of the Council of Finnish Academies (Tiedeakatemiain neuvottelukunta)  
2011–2012 Member of the Committee for the Ceremonial Conferment of Doctoral Degrees in the technical Schools of Aalto University (2012)  
2012– Member of the Governing Board of Heureka, the Finnish Science Centre  
2012– Member of the Board of Trustees of the Finnish Cultural Foundation  
2014– Member of the Publication Forum Panel on Electrical and electronic engineering, information engineering (JuFo)  
2011—2014 URSI Commission B (electromagnetic theory), Vice Chairman  
2014—2017 URSI Commission B (electromagnetic theory), Chairman  
2013–2015 Distinguished Lecturer of IEEE Antennas and Propagation Society  
2014– Member of Board, Finnish Academy of Technical Sciences

### Conference organisation

1983 secretary, URSI XI national convention of radio science (Otaniemi)  
1988 secretary, URSI/IEEE XIV national radio science convention (Otaniemi)  
Member, organising committees of the URSI/IEEE national radio science convention Tampere (1989), Kuopio (1990), Turku (1991), Oulu (1992), Otaniemi (1993), Sodankylä (1994), Otaniemi (1996), Otaniemi (2002)  
Member of the paper review board, European Microwave Conference (1990 Budapest), (1991 Stuttgart), (1995 Bologna), (1998 Amsterdam), (1999 Munich), (2000 Paris), (2002 Milan), (2003 Munich)  
1991 International Geoscience and Remote Sensing Symposium (Espoo, Finland), URSI part, member of the technical programme committee  
1991 International Geoscience and Remote Sensing Symposium (Espoo, Finland), URSI part, editor of the book of abstracts  
1991—1992 the 22nd European Microwave Conference (24.–28.8.1992, Espoo), secretary of the technical programme committee  
1993 the 23rd European Microwave Conference (1993, Madrid, Spain), member of the technical programme committee  
1992—1993 Organiser of *Bi-isotropics'93* seminar (1-4.2.1993, Otaniemi)  
1993 member of the organising committee, *Bianisotropics'93* meeting, (12–14.10.1993 Gomel, Belorussia)  
1994 the 24th European Microwave Conference (1994, Cannes, France) member of the technical programme committee  
1993—1994 Member of the organising committee of *Chiral'94* meeting (18–20.5.1994, Périgueux, France)  
1994—1995 Member of the organising committee, *Chiral'95* meeting (October 1995, State College, Pennsylvania, USA)  
1995—1996 Member of the organising committee, *Chiral'96* meeting (July 1996, Moscow—St. Petersburg, Russia)  
1996—1997 Member of the organising committee, *Bianisotropics'97* meeting (June 1997, Glasgow, Scotland)  
1997—1998 Member of the International Steering Committee of PIERS (Progress in Electromagnetics Research Symposium) 1998, Nantes, France  
1997—1998 Member of the organising committee, *Bianisotropics'98* meeting (June 1998, Braunschweig, Germany)

Member of the program committee of SPIE conference on subsurface sensors and applications (Denver 1999, San Diego 2000, San Diego 2001)

1999—2000 Member of the organising committee, *Bianisotropics 2000* meeting (September 2000, Lisbon, Portugal)

2001 member of the Technical programme committee of the URSI Electromagnetic Theory Symposium (May 2001, Victoria, Canada)

2001—2002 Member of the organising committee, *Bianisotropics 2002* meeting (May 2002, Marrakech, Morocco)

2002 Member of the Technical programme committee of *PIERS* meeting (July 2002, Cambridge, Mass., USA)

2003 Member of the Technical programme committee of International Student Seminar on Microwave Applications of Novel Physical Phenomena, (May 2003, Espoo, Finland)

2003 Member of the Technical programme committee of *PIERS* meeting (October 2003, Honolulu, Hawaii)

2003—2004 Member of the Technical programme committee of the URSI Electromagnetic Theory Symposium (May 2004, Pisa, Italy)

2003—2004 Chairman of the Technical programme committee of the *Bianisotropics 2004* meeting (September 2004, Ghent, Belgium)

2005—2006 Member of the Technical Programme Committee, *Bianisotropics 2006* meeting (September 2006, Samarkand, Uzbekistan)

2007 Co-Chairman of the Technical programme committee of the *Metamaterials 2007* meeting (October 2007, Rome, Italy)

2007 Member of the Technical programme committee of the URSI Electromagnetic Theory Symposium (July 2007, Ottawa, Canada)

2007 Member of the Technical programme committee of *PIERS* meeting (August 2007, Prague, Czech Republic)

2007 Member of the Programme committee of *Reflektori*, Symposium of Engineering Education (December 2007, Espoo, Finland)

2008 Member of the Organizing Committee of “Engineering Days” (January 2008, Espoo, Finland)

2008 Member of the Technical programme committee of *PIERS* meeting (March 2008, Hangzhou, China)

2008 Member of the Scientific Advisory committee of *META’08* NATO ARW (May 2008, Marrakesh, Morocco)

2008 Member of the Scientific Advisory Board of the *Metamaterials’2008* meeting (September 2008, Pamplona, Spain)

2008 Chairman of the URSI XXXI national radio science convention (October 28 2007, Espoo, Finland)

2009 Member of the Technical Program Committee of *PIERS* conference (Beijing, China, March 2009)

2009 Member of the Scientific Program Committee of ISEMA Conference (Electromagnetic Wave Interaction with Water and Moist Substances, Espoo, Finland, June 2009)

2009 Chairman, Technical Program Committee of Metamaterials 2009 Congress (London, UK, September 2009)

2010 Member of the Scientific Advisory Committee of *META’10* (2nd International Conference on Metamaterials, Photonic Crystals and Plasmonics) Conference (Cairo, Egypt, February 2010)

2010 Member of the Technical Program Committee of *PIERS* conference (Xian, China, March 2010)

2010 Member of the Technical Program Committee of *PIERS* conference (Cambridge, Mass., USA, July 2010)

2010 Member of the Technical Program Committee of the 2010 URSI International Symposium on Electromagnetic Theory (Berlin, August 2010)

2010 Member of the Advisory Board of Metamaterials 2010 congress (Karlsruhe, Germany, September 2010)

2010 Member of the International Steering Committee of the 2010 Asia–Pacific Radio Science Conference (Toyama, Japan, September 2010)

2010 Member of the Advisory Board of Metamaterials 2010 congress (Karlsruhe, Germany, September 2010)

2010 Member of the Programme committee of *Reflektori*, Symposium of Engineering Education (December 2010, Espoo, Finland)

2010 Member of the organizing committee of the Science Forum – Science and everyday life (“Tieteen päivät”, Helsinki, January 2011)

2011 Member of the Technical Programme Committee of Nanometa 2011 (Seefeld, Austria, January 2011)

2011 Member of the International Advisory Committee of *PIERS* conference (Marrakesh, Morocco, March 2011)

2011 Member of the Technical Program Committee of *PIERS* conference (Suzhou, China, September 2011)

2011 Member, Organizing Committee, URSI General Assembly and Scientific Symposium (Istanbul, Turkey, August 2011)

2012 Member of the Technical Program Committee of the PIERS conference (Kuala Lumpur, Malaysia, March 2012)

2012 Member of the Scientific Advisory Committee of AES 2012 (Paris, France, April 2012)

2012 Member of the Scientific Advisory Committee of META 2012 (Paris, France, April 2012)

2012 Member of the Technical Program Committee of Metamaterials'2012 (St. Petersburg, Russia, September 2012)

2012 Member of the International Scientific Committee of the First Asian Conference on Applied Electromagnetics and Wave Optics, Tabriz, Iran, December 2012

2013 Member of the organizing committee of the Science Forum ("Tieteen päivät", Helsinki, January 2013)

2013 Member of the Technical Program Committee of the PIERS conference (Taipei, Taiwan, March 2013)

2013 Member of the Scientific Advisory Committee of AES 2013 (Sharjah, UAE, March 2013)

2013 Member of the Scientific Advisory Committee of META 2013 (Sharjah, UAE, March 2013)

2013 Chairman of the Organizing Committee of the XXXIII Convention of Finnish Radio Science and SMARAD Seminar, Espoo, April 2013

2013 Member of the Technical Program Committee of EMTS (Hiroshima, Japan, May 2013)

2013 Co-Chairman of the Technical Program Committee of the PIERS conference (Stockholm, Sweden, August 2013)

2013 Member of the International Organizing Committee AP-RASC'13 (Taipei, Taiwan, September 2013)

2013 Member of the Technical Program Committee of Metamaterials'2013 (Bordeaux, France, September 2013)

2013–14 Member of the organizing committee of the Technology Forum ("Tekniikan päivät", Helsinki, January 2014)

2013–15 Chairman of the organizing committee of the Science Forum ("Tieteen päivät", Helsinki, January 2015)

2012–13 Chairman of the organizing committee for XXXIII URSI Convention on Radio Science and SMARAD Seminar (Espoo, Finland, April 2013).

2013 Member of the Steering Committee of URSI Commission F Microwave Signatures Symposium, Espoo, Finland, October 2013.

2013–2014 Member of the Scientific Advisory Committee of META 2014 (5th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Singapore, May 2014)

2013–2104 Co-Chairman of the Technical Program Committee of the PIERS conference (Progress in Electromagnetics Research, Guangzhou, China, August 2014)

2014–2015 Member of the Technical Programme Committee of AT-RASC, URSI Atlantic Radio Science Conference, (Gran Canaria, May 2015).

2015 Member of the International Advisory Committee of CEM'15 (Computational Electromagnetics International Workshop, Izmir, Turkey, July 2015)

2015 Member of the Scientific Advisory Committee of META 2015 (6th International Conference on Metamaterials, Photonic Crystals and Plasmonics, New York City, USA, August 2015)

2015 Co-Chairman of the Technical Programme Committee, PIERS 2015 (Progress in Electromagnetic Theory Symposium, Prague, Czech Republic, July 2015)

2015 Member of the Scientific Advisory Committee of META 2015 (6th International Conference on Metamaterials, Photonic Crystals and Plasmonics, New York City, USA, August 2015)

2015 Member of the Scientific Advisory Board of Metamaterials'2015 (the Ninth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Oxford, UK, September 2015)

2016 URSI B Liaison, EuCAP (10th European Conference on Antennas and Propagation, Davos, Switzerland, April 2016)

2016 Member of the Scientific Advisory Committee of META 2016 (7th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Malaga, Spain, July 2016)

2016 Co-Chairman of the Technical Programme Committee, PIERS 2016 (Progress in Electromagnetic Theory Symposium, Shanghai, China, August 2016)

2016 Chairman of the Organizing Committee and Organizing Committee of EMTS2016 (URSI Commission B International Symposium on Electromagnetic Theory, Espoo, Finland, August 2016)

2016 Member of the Scientific Advisory Board of Metamaterials'2016 (the Tenth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Crete, September 2016)

1993— Session chairman and session convener/organiser in several other international meetings

### Editor in journals

1989—1994 Sähkö-Tele (Electricity-Tele, national journal), special editor

1993—2002 and 2011— Associate Editor, The Radioscientist (from 1994, the title of this journal is URSI Radio Science Bulletin)

1996— member of the editorial board of the Radiotekhnika journal Electromagnetic Waves and Electronic Systems (Moscow)

1999— member of the editorial board of IEEE Transactions on Microwave Theory and Techniques

1999— member of the editorial board of International Journal of Subsurface Sensors and Applications (from 2006: Sensing and Imaging: an International Journal)

2001—2005 Associate Editor of IEEE Transactions on Antennas and Propagation

2006 Guest Editor in Special Issue of Electromagnetics Journal (Vol. 26, No. 3-4)

2008 Guest Editor in Special Issue of Metamaterials

2009— Member of the Editorial Board of the International Journal *Physics, Mathematics and Technics Problems* (Belarus)

2000— Member of the Editorial Board of *Journal of Electromagnetic Waves and Applications*

### Referee activity for scientific journals

IEEE Transactions on Microwave Theory and Techniques, IEEE Transactions on Antennas and Propagation, IEEE Transactions on Geoscience and Remote Sensing, IEEE Transactions on Instrumentation and Measurement, IEEE Transactions on Dielectrics and Electrical Insulation, IEEE Antennas and Wireless Propagation Letters, IEEE Photonics Journal, IEEE Microwave and Wireless Components Letters, IEEE Antennas and Propagation Magazine, Electromagnetics, Applied Computational Electromagnetics Society Journal, Geophysics, The Physical Review A, B, and E, Applied Physics Letters, Physical Review Letters, New Journal of Physics, Journal of Applied Physics, Physica B: Condensed Matter, Journal of Electromagnetic Waves and Applications, Progress in Electromagnetics Research, Journal of Physics A: Mathematical and General, Journal of Physics D: Applied Physics, Journal of Physics: Condensed Matter, Journal of Magnetism and Magnetic Materials, Microwave and Optical Technology Letters, Microwave and Guided Wave Letters, Archiv für Elektronik und Übertragungstechnik, Radio Science, The Radioscientist, Electronics Letters, Cold Regions Science and Technology, IEEE Proceedings, Journal de Physique, Progress in Electromagnetics Research, IEE Proceedings H: Microwaves, Antennas, and Propagation, IEE Proceedings: Optoelectronics, Applied Optics, Optics Letters, Optics Communications, Optics Express, Journal of Modern Optics, Journal of Optics, Journal of the Optical Society of America A, Journal of the Optical Society of America B, The European Physical Journal—Applied Physics, Canadian Journal of Physics, Measurement Science and Technology, IEICE Transactions on Electronics (Japan), ETRI Journal (Korea), Waves in Random Media, Waves in Random and Complex Media, Mathematical Problems in Engineering, Inverse Problems in Science and Engineering, International Journal of Applied Electromagnetics and Mechanics, International Journal of Antennas and Propagation, International Journal of Engineering Science, International Journal of Numerical Methods, South African Institute of Electrical Engineering Transactions, Journal of Optics A: Pure and Applied Optics, Journal of Electrostatics, Journal of Materials Science, Journal of Quantitative Spectroscopy and Radiative Transfer, Proceedings A of the Royal Society, Proceedings of the National Academy of Sciences, Wave Motion, Subsurface Sensing Technologies and Applications, Water Resources Research, Nature Physics, Nature Communications, Science, Science Advances, Philosophical Magazine, Metamaterials, Journal of Nanomaterials, Bioresource Technology, Journal of Computational and Theoretical Nanoscience, Communications in Computational Physics, International Materials Reviews, Advanced Electromagnetics Journal

### Membership in professional societies and academies

1984→ Finnish Physical Society

1980→ Institute of Electrical and Electronics Engineers, Student Member 1980, Member 1987, Senior Member 1991, Fellow 2006

1988—2000 The Planetary Society

1990→ The Electromagnetics Academy, Fellow 2007

1991→ American Association of Physics Teachers, American Physical Society  
1992→ European Physical Society  
2004→ Applied Computational Electromagnetics Society  
2007→ Finnish Academy of Sciences and Letters (Academia Scientiarum Fennica)  
2009→ Finnish Academy of Technical Sciences

### Supervisor of Doctoral theses

Olli Pekonen (1999), Perttu Puska (1999), Kimmo Kärkkäinen (2003), Juha Avelin (2003), Liisi Jylhä (2008), Mikko Pitkonen (2010), Johanna Leppävirta (2011), Jiaran Qi (2011), Henrik Kettunen (2011), Johannes Markkanen (2013), Kirsti Keltikangas (2013). Co-supervisor: Leila Puska (1999), Jari Hänninen (2004), Henrik Wallén (2006), Ilari Hänninen (2008).

### Academic evaluation work

Pre-examiner: doctoral thesis by Arto Olavi Lehto “Millimeter-wave Schottky mixer receivers for applications in radio astronomy and antenna measurements,” (TKK, E.E. Dept.) 30.5.1990.

Opponent: doctoral thesis by Jussi Tuovinen “Development of beam analysis and antenna measurement techniques at millimeter waves,” (TKK, E.E. Dept.) 17.6.1991.

Pre-examiner: doctoral thesis by Jouni Peltoniemi “Light scattering in planetary regoliths and cloudy atmospheres,” University of Helsinki, faculty of natural sciences, 16.4.1993.

Examiner for the docent position (space astronomy): Dr. Karri Muinonen, University of Helsinki, faculty of natural sciences, 8.12.1993.

Pre-examiner: doctoral thesis by Jouni Pulliainen “Investigation on the backscattering properties of Finnish boreal forests at C- and X-band: a semi-empirical modeling approach,” (TKK, E.E. Dept.) 8.3.1994.

Examiner for the docent position: Dr. Johan Helsing, the Royal Institute of Technology, (Stockholm, Sweden) 2.9.1994.

Opponent: doctoral thesis by Sten Rikte “Propagation of transient electromagnetic waves in stratified bi-isotropic media and related inverse scattering problems,” University of Lund, 20.1.1995.

Pre-examiner: doctoral thesis by Isak Petrus Theron “The circular birefringence of artificial chiral crystals at microwave frequencies,” (University of Stellenbosch, South Africa) 19.9.1995.

Faculty opponent of the Ph.D. dissertation by Martin Norgren “Wave-splitting approach to direct and inverse frequency-domain scattering of electromagnetic waves from stratified complex materials,” Royal Institute of Technology, Sweden, 15.11.1996

Evaluation of a candidate for promotion to Associate Professor, University of Kentucky, USA, 1996

Evaluation of Dr. Jouni Pulliainen for the position of docent (space technology), TKK, 1996

Pre-examiner: doctoral thesis by Jochen Grandell “Active and passive microwave remote sensing of large scale surface characteristics,” (TKK, 1998–1999)

Interrogator: licentiate thesis by Daniel Sjöberg, “Direct and inverse scattering of electromagnetic waves in non-linear media,” Lund Institute of Technology, 6.5.1999

External evaluator: doctoral thesis by Elazar Sonnenschein, “Waves and rays in the presence of lossy media,” Ben-Gurion University, Israel, 1999

Evaluation of Dr. Jouni Peltoniemi for the position of docent (astronomical remote sensing), Helsinki University, 2000

Evaluation of Dr. Martin Norgren for the position of docent (theoretical electrical engineering), Royal Institute of Technology, Sweden, 2000

Pre-examiner and opponent: doctoral thesis by Jens Reinert, “Characterisierung chiraler Streukörper und Materialien,” Technical University of Braunschweig, Germany, 2000–2001 (defence 18.1.2001)

Evaluation of Dr. Ari Viljanen for the docent position (theoretical physics) University of Helsinki, Department of Physical Sciences, 2002

Evaluation for a habilitation position, Université Pierre et Marie Curie (Paris VI), 2002

Chairman of the Committee for filling the professor chair in computational engineering at TKK, 2002–2003

Committee member of the doctoral dissertation of Mr. Björn Widenberg, “Thick frequency-selective structures”, Lund University, Sweden, 5.6.2003

External opponent and committee member of the doctoral dissertation, “Electromagnetic waves in artificial media with application to lens antennas”, of Mr. Mário Silveirinha, Technical University of Lisbon, Portugal, 1.9.2003

Evaluation of a candidate for promotion to Professor, Delft University of Technology, Netherlands, 2004

Opponent of the Ph.D. dissertation by Juhani Hämäläinen “Partitioning of parameter spaces of physical models”, University of Jyväskylä, Finland, 30.10.2004

Committee member of the doctoral dissertation of Ms. Ainhoa G. Gorriti, “Electrodynamic response of soils”, Delft University of Technology, Netherlands, 2.11.2004

Interrogator: licentiate thesis by Christian Engström, “Effective materials in electromagnetics,” Lund Institute of Technology, Sweden, 1.2.2005

Evaluation of a candidate for promotion to Professor, Ghent University, Belgium, 2005

Opponent of the Dr. Tech. Dissertation by Marke Kallio “The elastic and damping properties of magnetorheological elastomers”, Tampere University of Technology, Finland, 27.5.2005

Evaluation of Dr. Taavi Hirvonen for the position of docent (radio engineering), Oulu University, Finland, 2005

Evaluation for a habilitation position, Universität Osnabrück, Germany, 2006

Evaluation of Dr. Carina Savander-Ranne for the position of docent (pedagogy of engineering education), Tampere University of Technology, Finland, 2006

Evaluation of Dr. Samuli Kolari for the position of docent (pedagogy of engineering education), Tampere University of Technology, Finland, 2006

External evaluation of the doctoral thesis “Electromagnetic properties and macroscopic characterization of composite materials” of Chengwei Qiu, National University of Singapore, 2007.

External evaluation of the doctoral thesis “Extension of the finite-difference time-domain method to the study of microwave hybrid structures including active and passive lumped circuits” of Oscar González Rodríguez, University of Cantabria, Spain, 2008.

Evaluation for tenured professor position and promotion, Northeastern University, USA, 2010.

Evaluation for faculty positions: Columbia University, Stanford University, Princeton University, 2010.

Interrogator: licentiate thesis by Kristin Persson, “Retrieval of equivalent currents by the use of an integral representation and the extinction theorem—radome applications,” Lund University, Sweden, 5.2.2010

External reporter and committee member of the doctoral dissertation, “Electromagnetic wave propagation in complex media and metamaterials: a geometric algebra approach”, of Mr. Sérgio de Almeida Matos, Technical University of Lisbon, Portugal, 10.9.2010.

External reporter and committee member of the doctoral dissertation, “Modélisation et caractérisation spectrale de métamatériaux” of Mr. Mohamed Hicham Belyamoun, Université Pierre et Marie Curie, Paris, France, 1.12.2010.

External examiner of the doctoral thesis “Microwave absorbing materials—characterization, synthesis, and applications” of Ms. Irena Zivkovic, Institute of Applied Physics, Universität Bern, Switzerland, May 2012.

Evaluation of Dr. Evgenij Zubko for the position of a docent in astrophysics, University of Helsinki, August 2012.

External reporter and committee member of the doctoral dissertation, “Approches multiphysique et multi-échelle pour la modélisation électromagnétique d’hétérostructures et l’analyse des propriétés électriques de cellules et tissus biologiques” of Mr. Melvin Essone Mezeme, Université de Bretagne Occidentale, Brest, France, 17.12.2012.

Evaluation of a professor position in Quaid-i-Azam University, Pakistan.

External examiner of the doctoral thesis “Effects of random errors on scattering properties and effective permittivity” of Mr. Zeeshan Akbar Awan, Quaid-i-Azam University, Pakistan, July 2013.

External examiner and committee member of the doctoral thesis “Revisiting bi-isotropic media: new analytical and geometrical approaches” of Ms. Filipa Prudêncio, Instituto Superior Técnico, Lisbon, Portugal, November 2014.

External examiner and committee member of the doctoral thesis “Investigations into homogenization of electromagnetic metamaterials” of Mr. Niels Clausen, DTU, Copenhagen, Denmark.

External examiner of the doctoral thesis “Boundary integral operators in linear and second-order nonlinear nano-optics” of Mr. Jouni Mkitalo, Tampere University of Technology, February 2015.

External examiner of the doctoral thesis “Electromagnetic wave scattering from strip in the presence of chiral medium using Kobayashi potential method” of Mr. Muhammad Afzaal, Quaid-i-Azam University, Pakistan, November 2015.

Evaluations for tenure promotion for several universities

Evaluations for various funding agencies, foundations, and organisations, Finland and abroad. (MacArthur Foun-



dation (USA), l'Institut Universitaire de France, Leverhulme Foundation, Tübitak (Turkey), International Science Foundation (SOROS Foundation), Academia Europaea, Royal Society, Wiley, Israel Science Foundation, Optical Society of America Award Committee, etc.)

### Scientific output

International books (6), Books in Finnish (12), refereed international journal articles (230), international conference articles and abstracts (256), domestic conference articles (52), technical reports (150), 1 patent, other articles (90).

4 plenaries, several keynote and invited presentations in international conferences.

### Continuing education

Leadership course, 1998–1999, conducted by FEMDI Services (Johtamistaidon opisto).

YOOP course at TKK, 1999–2000. (Yliopisto-opetuksen opintokokonaisuus, Pedagogical education for university teachers, 15 study weeks.)

### Military career

Corporal (1987).

Five months as radar engineer at the Signals Repair Centre. Project on interaction of radio waves in the troposphere and the problem of radar angels.

### Teaching

Teaching assistant; several courses at the Helsinki University of Technology, 1980–1992.

Lecturer in TKK: Radio wave propagation (1986, 1987, 1988, 1989), Antenna theory (1988, 1989, 1991), Mathematical methods in electromagnetics (1986), Approximate methods in electromagnetics (1988), Static field theory (1991, 1992, 1993, 1994, 1995, 1997, 1998, 1999, 2001, 2002, 2003, 2005, 2007, 2010, 2011), Dynamic field theory (1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2002, 2003, 2004, 2005, 2007, 2011, 2012), Elements of electromagnetic field theory and guided waves (2012, 2013), Electromagnetic Fields (2015), Postgraduate course in radio engineering (1984, 1986), Postgraduate course in electromagnetics (1991, 1998, 2006, 2007, 2008), History of electrical engineering (1992, 1997, 2009, 2010, 2011, 2013), History and innovations of electrical engineering (2014).

IEEE Antennas and Propagation Society Distinguished Lecturer 2013–2015. 14 DL talks on electromagnetics and metamaterials around the world.

Lecturer for special courses: INSKO, Nokia Corporation, and Telecom Finland, YOOP programme (pedagogical 15 study week course for university-level teachers)

Course on electromagnetic field theory, Spring 1995, National Defence College, Helsinki.

Good Teacher Award for the academic year 1991–1992, (Helsinki University of Technology), 9.9.1992.

Teacher of the Year (1995), (elected by the Student Union of the Helsinki University of Technology)

EIS Award (the Finnish Society of Electronics Engineers) for teaching and research in electromagnetics

Several teaching awards by the ECE department and TKK 1993– (including textbook of the year (TKK, 2000))

### Externally funded research projects

2003–2006 Modelling and numerical calculation of effective parameters of electromagnetics materials (Academy of Finland, 150000 euros)

2005–2010 Electromagnetics of geophysical, composite and metamaterials (Academy of Finland, 450000 euros)

2008–2011 Electromagnetic characterization of nanostructured materials (coordinator), EU-funded network grant involving nine research groups.

2012–2016 Computational and mathematical models for electromagnetic wave interaction with complex material structures (Consortium director). (Academy of Finland, 800000 euros)

2013–2016 Exploiting scale effects for high-efficiency thermal systems (Aalto Energy Program, 200000 euros)

### Other

Presentation in the MTV-akatemia (the educational programme one of the television channels in Finland) about light and electricity, 21.1.1996; rerun later.

Interviews to the Finnish Broadcasting Company about electricity and magnetism: Radio Vega (the Swedish-language channel, 1997), Ylen Ykkönen (the main Finnish-language channel, December 2001 and January 2002 (Kultakuume), March 2006, September 2006, May 2007 (radiaattori)).

Espoo Ambassador 2014. (The Award is given to an active member in international scientific associations representing ones own university and the Finnish scientific expertise and research work.)