

**1. Personal details:**

**Name:** Muinonen, Karri Olavi

**ORCID ID:** 0000-0001-8058-2642

**Year of birth:** 1961

**Citizenship:** Finland

**Website:** <https://wiki.helsinki.fi/display/PSR/Karri+Muinonen>

**2. Education and degrees completed:**

Doctor of Philosophy, Sept. 1990 & Master of Science, May 1986, theoretical physics, University of Helsinki.

**Docentships:** Astronomy, University of Oulu, 1995; Space astronomy, University of Helsinki, 1994.

**3. Current employment:**

Academy Professor, Department of Physics, University of Helsinki, September 1, 2021-; Professor of Astronomy (Planetary Astronomy & Geodesy), Department of Physics, University of Helsinki & Finnish Geospatial Research Institute FGI, National Land Survey, March 1, 2009- ;

Professor in charge of the Astronomy Curriculum and 20 employees;

Adjunct Scientist, Lowell Observatory, Flagstaff, Arizona, February 1993-

**4. Former employment:**

Astronomer (permanent staff member), Observatory, University of Helsinki: Aug. 1992 - Febr. 2009;

NASA Postdoctoral Fellow, Lowell Observatory, Arizona, U.S.A., Sept. 1990 - Jan. 1993

**Leaves of absence:** University Researcher, University of Helsinki, July-Dec. 2007, July-Aug. 2006, Oct.-Dec. 2005, Aug. 2005, Oct. 2004 - March 2005, Aug.-Dec. 2003;

Academy Research Fellow, Academy of Finland, May 1998 - July 2003;

Visiting Academy Research Fellow, Astronomical Observatory of Torino, Italy, Aug. 2001 - July 2002;

Director, Observatory, University of Helsinki: Sept. 1999 - Dec. 2000;

Research Scientist, ABB Corporate Research and University of Helsinki, Jan.-Apr. 1998;

Special Researcher, University of Helsinki, Jan. 1995 - Dec. 1997;

Visiting Special Researcher, Astronomical Observatory, Uppsala University, Sweden: June-Dec. 1997;

Research Fellow, University of Pisa, Jan. - June 1996, funded by European Commission Training and Mobility of Researchers network and University of Helsinki

**5. Career breaks:** None.**6. Personal research funding and grants:**

Planetary system in scattered light (Acad. Professor, project funding, 1st part), Acad. Finland, 2021-2024, 660 000 euros

Planetary system in scattered light (Academy Professor post), Acad. Finland, 2021-2026, 798 750 euros

Planetary spectrometry, Acad. Finland, 2019-2023, 399 323 euros (Consortium total 756 725 euros)

Ultrasonic control of biological microscopy samples, HiLIFE Proof of Concept Grant (HiPOC), Univ. Helsinki, 2018-2019, 43 000 euros

Spectropolarimetric goniometer, Research infrastructure funding, Univ. Helsinki, 2017-

2018, 180 000 euros  
 Scattering and Absorption of Electromagnetic Waves in Particulate Media (SAEMPL),  
 ERC Advanced Grant, Exit funding, Univ. Helsinki, 2018-2019, 345 304 euros  
 The Earth spherical albedo from space-geodetic measurements, Acad. Finland, 2016-2020,  
 446 554 euros (Consortium total 843 253 euros)  
 Scattering and Absorption of Electromagnetic Waves in Particulate Media (SAEMPL),  
 ERC Advanced Grant, Incentive funding, Univ. Helsinki, 2013-2018, 125 000 euros  
 Scattering and Absorption of Electromagnetic Waves in Particulate Media (SAEMPL),  
 ERC Advanced Grant, 2013-2018, 2.75 million euros  
 Electromagnetic Wave Scattering by Complex Random Media, Acad. Finland, 2012–2016,  
 420 613 euros (consortium in total: 1.2 million euros)  
 Light Scattering by Solar-System Small Particles, Acad. Finland, 2009–2012, 500 000  
 euros  
 European Leadership in Space Astrometry (ELSA), European Commission Marie Curie  
 Research Training Network (MCRTRN), Participant No. 9, University of Helsinki, 2006-  
 2010, 199 017 euros  
 Mercury, lunar, and solar science with BepiColombo and SMART-1: X-ray fluorescence  
 from small-particle media, Acad. Finland, 2005–2008, 128 400 euros  
 Coherent backscattering by complex random media, Acad. Finland (funding for postdoc-  
 toral fellow Dr. Evgenij Zubko), 2005–2006, 26 340 euros  
 Physical and dynamical studies of planetary-system objects, Acad. Finland, 2004–2006,  
 120 000 euros  
 Single-particle optical scattering codes for biological warfare agent characterization: ray  
 tracing routines, Battelle, U.S.A., 2004-2005, 50 000 USD  
 Asteroid and exoplanet orbital inversion and linking problems, Univ. Helsinki, 2003–2005,  
 100 000 euros  
 Light scattering by Gaussian random media (Academy Research Fellow -post), Acad. Fin-  
 land, 1999–2003, 260 000 euros  
 Light scattering by small particles, asteroids, and comets, Acad. Finland, 2002–2005,  
 121 000 euros  
 Interpreting basis for ESA SMART-1/AMIE observations of the Moon with experience  
 from Clementine and Lunar Prospector data analysis, and laboratory and theoretical mod-  
 eling of light scattering in dusty surfaces, EU/INTAS, 2001–2004, 60 000 euros  
 Planetary science program, ANTARES, Acad. Finland, 2001–2003, 53 500 euros  
 Coherent multiple backscattering by inhomogeneous media, Finnish-Ukrainian bilateral  
 researcher exchange, Acad. Finland, 1997-2001, 25 700 euros  
 Inner-coma interaction of cometary dust, gas, and electromagnetic radiation, Finnish-  
 Russian bilateral researcher exchange, Acad. Finland, 2001, 2 600 euros  
 Celestial mechanics and scattering theory of near-Earth asteroids and comets, Acad. Fin-  
 land, 1998, 16 800 euros  
 Near-Earth asteroids and comets (Special Researcher -post), Univ. Helsinki, 1995–1997,  
 119 000 euros

## **7. Leadership and supervision experience:**

### **Supervision, postdoctoral researchers:**

2022, Eric MacLennan (Ph.D. 2018)  
 2021, Lauri Siltala (Ph.D. 2021)  
 2018-20, Guanglang Xu (Ph.D. 2017);  
 2018-19, Jesus Escobar-Cerezo (Ph.D. 2018);  
 2016, Anne Virkki (Ph.D. 2016);  
 2013-18, Johannes Markkanen (Ph.D. 2013);

2013, Daniel Guirado (Ph.D. 2013);  
2011-2014, Antti Penttilä (Ph.D. 2011);  
2007-2013, Mikael Granvik (Ph.D. 2008);  
2005-2006, 2009-2013, Evgenij Zubko (Ph.D. 2003)

**Supervision, Ph.D. students**, University of Helsinki (18 Ph.D. theses):

2021, Lauri Siltala (Co-Advisor);  
2021, Julia Martikainen;  
2020, Joonas Herranen;  
2020, Timo Väisänen;  
2019, Grigori Fedorets;  
2016, Olli Wilkman;  
2016, Anne Virkki;  
2013, Hannakaisa Lindqvist (Co-Advisor);  
2012, Dagmara Oszkiewicz;  
2011, Jani Tyynelä, Antti Penttilä (Co-Advisor);  
2009, Jyri Näränen;  
2008, Mikael Granvik, Johanna Torppa (Co-Advisor);  
2005, Jenni Virtanen;  
2003, Sanna Kaasalainen;  
2002, Timo Nousiainen;  
1998, Jukka Piironen;

Supervision, elsewhere (2 Ph.D. theses):

2001, Kari Saarinen, University of Jyväskylä (Co-Advisor);  
1998, Johan Lagerros, Uppsala University (Co-Advisor).

**Supervision, Ph.Lic. and M.Sc. students:**

3 Ph.Lic. and 15 M.Sc. theses 1994-2020.

**Leader of research work:**

Planetary-System Research -group, University of Helsinki, leader, 1998-  
ESA Comet Interceptor Mission, Associated Scientist, 2019-;  
NASA Double Asteroid Redirection Test Mission (DART), Investigation Team Member,  
2019-;  
EU Cost Action CA18104: Revealing the Milky Way with Gaia, Member of Management  
Committee, National Coordinator, 2019-2023;  
ESA Asteroid Deflection Mission Hera, ASPECT Asteroid Spectrometer, Senior Scientist,  
2015-;  
EU Cost Action MP1104: Polarimetry as a tool to study the Solar System and beyond,  
Member of Management Committee, National Coordinator, 2011-2015;  
Gaia Research for European Astronomy Training (GREAT), National Representative,  
2009-2015;  
Gaia Coordination Unit 4 Solar-System-Object Development Unit DU456 Orbital inver-  
sion, Manager, 2005-;  
BepiColombo MIXS Mercury Imaging X-ray Spectrometer, Co-Principal Investigator,  
2004-;  
Physical and dynamical characterization of near-Earth objects (Nordic Near-Earth-Object  
Network NEON), Principal Investigator, Nordic Optical Telescope, La Palma, Canary Is-  
lands, Spain, 2003-2006;  
Polarimetric and photometric phase effects of asteroids and transneptunian objects, NASA  
Outer Planets Research Program, contract NNX10AP93G, Co-Investigator, 2010-;  
Imaging photometric and polarimetric remote sensing of the Moon, NASA Lunar Ad-

vanced Science and Exploration Research Program, contract NNX11AB25G, Co-Investigator, 2010-;  
Transneptunian Objects: Characterization of Surface Properties, Large Program, ESO Very Large Telescope, Paranal, Chile, Co-Investigator, 2006-2008;  
BepiColombo SIMBIO-SYS Spectrometer and Imagers for MPO BepiColombo Integrated Observatory System, 2004;  
BepiColombo SIXS Solar Intensity X-ray and particle Spectrometer, Co-Investigator, 2004-;  
NESS (Near-Earth Space Surveillance), Member of Science Team, 2002-2007;  
SMART-1 XSM X-Ray Solar Monitor, Co-Investigator, 1999-;  
SMART-1 AMIE Panchromatic Camera, Co-Investigator, 1999-;  
SMART-1 D-CIXS Imaging X-Ray Spectrometer, Co-Investigator, 1998-;  
Lowell Observatory Near-Earth-Object Search (LONEOS), NASA Research Project, Co-Investigator, 1993-2010

### **8. Teaching merits:**

Professor in charge of Astronomy Curriculum, Dept. Physics, Univ. Helsinki, 2010-  
Organizer of seminar series for students in Astronomy (Planetary-System Research), 1998-  
Teaching experience at the University of Helsinki (1993-2020): Celestial Mechanics (8 cr; 12 times; subject level in astronomy, also at the Univ. Oulu);  
Solar System Physics (5 cr; five times; subject level);  
Planetary Geophysics (5 cr; three times, several lecturers; subject level in geophysics);  
Inverse Methods in Astronomy (7 cr; three times, several lecturers; advanced & postgraduate level); Electromagnetic Radiation Mechanisms (7 cr; twice; advanced & postgraduate level);  
Electromagnetic Scattering I & II (10 cr; ten times; advanced & postgraduate level);  
Dynamics: Advanced Course (7 cr; three times, several lecturers; advanced & postgraduate level);  
Asteroids (7 cr; once; advanced & postgraduate level);  
Space Geodesy: Advanced Course (5 cr; once; advanced & postgraduate level);  
Electromagnetic scattering and absorption (5 cr; once, advanced level).  
In the courses, students have been interactively involved in problem-based learning including topical presentations with opponents.

### **9. Experience of organizing scientific meetings:**

**2023:** Chairman, Co-Organizer: BepiColombo SIMBIO-SYS Science Team meeting, Pyhätunturi, Finland, January 9-13, 2023, 30 participants;  
**2021,** Chairman, Asteroids and Comets: revealing the history of the Solar System (Working Group 3, Milky Way Gaia Cost Action), Helsinki, Finland, 2021 September 28-29, 70 participants (hybrid in situ and remote attendance);  
**2019:** The 6th International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'19), Hangzhou, China, 2019 June 17-21, 200 participants; 18th Conference on Electromagnetic and Light Scattering, Hangzhou, China, 2019 June 10-14, 200 participants;  
**2018:** Conference on Atmosphereless Solar System Bodies in the Space Exploration Era, Kharkiv, Ukraine, 2018 June 19-22, 80 participants;  
17th Conference on Electromagnetic and Light Scattering, College Station, Texas, U.S.A., 2018 March 5-9, 150 participants;  
**2017:** Chairman, ERC/SAEMPL Workshop on Spectroscopy, Photometry, and Polarimetry of Airless Solar System Objects, Tuusula, Finland, 2017 Sept. 14-15, 30 participants; Chairman, Finnish URSI Convention on Radio Science, Helsinki, Finland, 2017 Sept. 7-8,

20 participants;  
The 5th International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'17), Hefei, China, 2017 June 19-23, 150 participants;  
16th Conference on Electromagnetic and Light Scattering, College Park, Maryland, U.S.A., 2017 March 19-25, 100 participants;  
**2016:** Electromagnetic Theory Symposium, Espoo, Finland, 2016 Aug. 14-18, 200 participants;  
**2015:** 15th Conference on Electromagnetic and Light Scattering, Leipzig, Germany, 2015 June 22-26, 100 participants;  
The 4th International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'15), Wuhan, China, 2015 June 1-5, 100 participants;  
**2014:** Chairman, Organizer, Asteroids, Comets, Meteors, Helsinki, Finland, June 30 - July 4, 2014, 500 participants;  
**2013:** Vice-Chairman, Spectropolarimetric experiments for remote sensing, Kirkkonummi, Finland, 2013 August 19-21, 30 participants;  
The 3rd International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'13), Nagoya, China, 2013 July 29-31, 100 participants;  
14th Conference on Electromagnetic and Light Scattering, Lille, France, 2013 June 17-21, 120 participants;  
**2012:** Chairman, Gaia Coordination Unit 4 meeting, Helsinki, May 2012, 20 participants;  
**2011:** Vice-Chairman, Program Committee, Physics Days, Helsinki, Finland, March 2011, 300 participants;  
The 2nd International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'11), Langzhou, China, 2011 June 20-24, 100 participants;  
13th Conference on Electromagnetic and Light Scattering, Taormina, Italy, 2011 September 26-30, 70 participants;  
**2010:** Chairman, Organizer, 12th Conference on Electromagnetic and Light Scattering, University of Helsinki, Finland, 2010 June 28 -July 2, 80 participants;  
**2009:** The 1st International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'09), Xi'an, China, 2009 July 13-17, 70 participants;  
**2008:** 11th Conference on Electromagnetic and Light Scattering, University of Hertfordshire, United Kingdom, 2008 September 8-12, 60 participants;  
**2007:** 10th Conference on Electromagnetic and Light Scattering, Bodrum, Turkey, 2007 June 17-22, 80 participants;  
**2005:** 8th Conference on Electromagnetic and Light Scattering, Salobrena, Granada, Spain, 2005 May 16-20, 60 participants;  
**2004:** The Three-Dimensional Universe with Gaia, Paris, 2004 October 4-7 (Member of International Advisory Committee), 200 participants;  
**2001:** Workshop on Collaboration and Coordination among NEO Observers and Orbital Computers, Kurashiki, Okayama, Japan, 2001 Oct. 23-26, 60 participants;  
Asteroids 2001 -meeting, Palermo, Italy, 2000 June 11-15, 200 participants;  
**2000:** Suomen Avaruustutkijoiden VIII COSPAR-kokous, Helsinki, 2000 Sept. 25-27, 40 participants;  
5th Conference on Electromagnetic and Light Scattering, Halifax, Canada, 2000 Aug. 28 - Sept. 1, 60 participants;  
**1999:** Lähiavaruuden kappaleiden ympäristö- ja turvallisuusriskit (Hazards due to Near-Earth Objects), Helsinki, Finland, 1999 May 11, 40 participants;  
**1997:** International Workshop on Light Scattering by Nonspherical Particles, Helsinki, Finland, 1997 June 9-11 (2nd Conference on Electromagnetic and Light Scattering), 40 participants;  
**1996:** International Workshop Tunguska'96, Bologna, Italy, 1996 July 15-17, 40 partici-

pants.

#### **10. Patents, inventions, awards and honours:**

Patent No. 196 10 438 in Germany entitled “Verfahren und Vorrichtung zur Bestimmung der Lichtabsorption eines beliebig geformten Partikels” by Dr. Christian Sasse, Dr. Karri **Muironen**, Mr. Jukka Piironen, and Mr. Hermann Spegassner, 1998 November 26.

Patent No. US 7 920 262 B2 in the U.S.A. entitled “Systems for measuring backscattered light using rotating mirror” by Dr. Gordon W. Videen and Prof. Karri O. **Muironen**, 2011 April 5

Patent application FP300035FI entitled “Device and method for acoustic levitation” by, in alphabetical order, Dr. Maria Gritsevich, Prof. Edward Haeggström, Mr. Petteri Helander, Dr. Ivan Kassamakov, Mr. Göran Maconi, Prof. Karri **Muironen**, Dr. Antti Penttilä, Mr. Tuomas Puranen, and Dr. Ari Salmi, filed on 2018 April 14

Invention Disclosure “Device for accurate measurement of Mueller matrix elements for scattering by small samples” by, in alphabetical order, Dr. Maria Gritsevich, Prof. Edward Haeggström, Mr. Petteri Helander, Dr. Ivan Kassamakov, Mr. Göran Maconi, Prof. Karri **Muironen**, Dr. Antti Penttilä, Mr. Tuomas Puranen, and Dr. Ari Salmi, 2017

Invention Disclosure “Device for accurate measurement of single-scattering albedo for small samples” by, in alphabetical order, Dr. Maria Gritsevich, Prof. Edward Haeggström, Dr. Ivan Kassamakov, Prof. Karri **Muironen**, and Dr. Antti Penttilä, 2017

Invention Disclosure “Maelscan - instrument for rapid in situ red-blood-cell malaria-parasite screening” by, in alphabetical order, Dr. Maria Gritsevich, Prof. Edward Haeggström, Dr. Ivan Kassamakov, Dr. Johannes Markkanen, Prof. Karri **Muironen**, and Dr. Antti Penttilä, 2017

In 2010, *Journal of Quantitative Spectroscopy and Radiative Transfer* has granted a 50-Year Milestone Award for “Light scattering by Gaussian random particles: ray optics approximation” by Muironen et al. (Ref. 22), placing the article among the four scientifically most significant articles in light scattering in the history of the journal.

European Space Sciences Committee, European Science Foundation, Member, 2012-2018  
Finnish Academy of Science and Letters, Member, April 21, 2017-

In 1991, asteroid No. 4665 named “Muironen” in recognition of work on coherent backscattering by small particles and orbital studies of near-Earth objects.

#### **11. Other key scientific or academic merits:**

##### **Reviewer in Professorships:**

2018, Assoc. Prof. Stephanie Wener, University of Bergen, Norway

##### **Reviewer in Habilitation Dissertations:**

2017, Dr. Josef Durech, Charles University, Prague, The Czech Republic

##### **Opponent in Ph.D.–Dissertations:**

2015, Dr. Francois Andriu, Université Paris-Sud;

2012, Dr. Ola Karlsson, Uppsala University;

2007, Dr. Serge Mouret, Paris Observatory;

2004, Dr. Tommy Grav, University of Oslo;

2002, Dr. Erik Skoglöv, Uppsala University;

2001, Dr. Wang Huining, Helsinki University of Technology;

1996, Dr. Anssi Toropainen, Helsinki University of Technology.

##### **Reviewer or Committee Member in Ph.D.–Dissertations (year:number):**

22:2, 20:4, 19:2, 18:2, 17:1, 16:2, 15:2, 14:1, 12:2, 11:1, 10:2, 09:1, 07:1, 05:1, 03:1, 01:2,

94:2

**Referee activity** (years 2020-1992, number of articles):

23:1, 22:4, 21:2, 20:2, 19:4, 18:3, 17:5, 16:4, 15:4, 14:3, 13:3, 12:5, 11:5, 10:2, 09:2, 08:2, 07:5, 06:7, 05:7, 04:4, 03:7, 02:6, 01:13, 00:7, 99:3, 98:4, 97:7, 96:6, 95:3, 94:4, 93:3, 92:3  
Examples of journals: Nature, Science, Astronomy & Astrophysics, Icarus, Journal of Quantitative Spectroscopy & Radiative Transfer

**Reviewer of Proposals:**

U.S. National Science Foundation, External Reviewer, 1 review, 2022;  
Hubble Space Telescope, 48 reviews, 2020;  
Die Deutsche Forschungsgemeinschaft, 1 review, 2019;  
U.S. National Science Foundation, External Reviewer, 1 review, 2016;  
U.S. NASA Planetary Geology and Geophysics Program, 2013 and 1999 Review Panels, External Reviewer, 1 review in each;  
Latvian Science Council, Expert Review, 2013;  
Agence Nationale de la Recherche (ANR), France, 2012, External Reviewer, 1 review;  
Swedish Space Board, 2009, External Reviewer, 1 review;  
German Research Foundation DFG 2007, External Reviewer, 1 review;  
U.S. NASA Planetary Geology and Geophysics Peer Review Panel Member, Colorado, U.S.A., 2004, 18 reviews;  
U.S. NASA Planetary Astronomy Program, 1998 Review Panel, External Reviewer, 2 reviews;  
U.S. NASA Planetary Geology and Geophysics Program, 1999 and 2013 Review Panels, External Reviewer, 1 review in each;  
Italian INAF National Research Projects, 2002 proposals, 1 review

**Memberships in working groups:**

The NOT Transient Explorer Instrument (NTE), Board Member, 2019-;  
ESA Marco Polo Mission, Science Study Team Member, 2007-2010;  
ESA Gaia, Solar System Working Group, Task Leader on Asteroid Orbit Determination and Prediction, 2001-2005;  
International Space Station, ESA/ICAPS Topical Team on Interactions between Cosmic and Atmospheric Particle Systems, 1997-;  
The Spaceguard Survey, NASA International Near-Earth-Object Detection Workshop, 1991-1992.

**12. Memberships and positions of trust in scientific societies:**

**Memberships in Organizing Committees for Compilation Works:**

2015: Asteroids IV -book, Space Science Series, University of Arizona Press, Arizona, U.S.A.;  
Asteroids III, Space Science Series, University of Arizona Press, Arizona, U.S.A., 2001;

**Positions of trust:**

Nordic Optical Telescope (NOT), Council, Member, 2020-;  
J. Quantitat. Spectrosc. Radiat. Transf., Associate Editor 2011-2021, Honorary Associate Editor 2021-  
Finnish National Committee of Astronomy, Chairman 2019-2023, Member 2023-, Secretary, 1998-2001; National Astronomy Education Coordinator, 2020-2022;  
International Astronomical Union, Member 1991-; Secretary of Commission 15 1997-2000; Member of Commission 15 Organizing Committee 2000-2006; Member of Commission

20 Organizing Committee 2006–; Commission 15 Task Group for Physical Properties of Near-Earth Objects, Chairman 2008–2012; Commission 15 Task Group for Asteroid Magnitudes, Member 2006–; Commission 15 Task Group for Asteroid Polarimetric Albedo Calibration, Member 2006–; Working Group for Near-Earth Objects, Member 1994–2006, 2012–; Member of Organizing Committee, 2000–2006, Member of Technical Review Committee, 2000–2006; Working Group for Comets and Distant Objects, Member 2000–2006; EuroPlaNet, University-of-Helsinki Information Correspondent, 2007–; The Spaceguard Foundation, Member 1996–; Member of the Board of Directors 1996–2002; European Geophysical Society, Member 1998–; Optical Society of America, Member 1987–; Institute of Electrical and Electronics Engineers, Member 1987–; Division for Planetary Sciences, American Astronomical Society, Affiliate Member 1990–; Finnish Physical Society, Member 1984–; Board Member in the Division for Astro- and Space Physics 1993– and Secretary 1994; Finnish Astronomical Society, Member 1988–, Board Member 1993–1997, Chairman 1994–1997; Finnish Optical Society, Member 1996–

**13. Link to complete Curriculum Vitae:**

<https://wiki.helsinki.fi/display/PSR/Karri+Muinonen>

**14. Hobbies:**

**Nordic walking**, 2020-;

**Swimming**, 2010-:

Keravan Uimarit ry, member 2010-2016, 2019- (<http://keui.sporttisaitti.com/>);

Simmis Wanda ry, member 2016-2021 (<http://www.simmiswanda.fi/>);

**Badminton**, 2002-